

Manitoba Annual Summary of Communicable Diseases

2014

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Epidemiology & Surveillance

Public Health Branch

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TABLE OF CONTENTS

Abbreviations	7
Regional Health Authorities.....	7
Acknowledgments	8
2014 Highlights	9
Nosocomial and Antibiotic Resistant Organisms	9
Enteric Diseases	9
Vaccine Preventable Diseases	9
Zoonotic and Environmental Diseases	9
Other Diseases	9
Introduction	10
Methods.....	11
About Surveillance Data	13
Reportable Diseases Present in Manitoba	14
Nosocomial and Antibiotic Resistant Organisms	17
<i>Clostridium difficile</i> Infection	18
Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)	20
Vancomycin Resistant <i>Enterococci</i> (VRE)	22
Enteric Diseases	24
Amebiasis.....	25
Campylobacteriosis	27
Cryptosporidiosis.....	29
Giardiasis	31
Hepatitis A.....	33
Salmonellosis	35
Shigellosis	37
Verotoxigenic <i>Escherichia coli</i> (VTEC)	39
Vaccine Preventable Diseases	41
Invasive <i>Haemophilus influenzae</i> Disease (IHD)	42
Invasive Pneumococcal Disease (IPD)	44
Measles	46
Pertussis	48
Zoonotic and Environmental Diseases	50
Blastomycosis	51
Lyme Disease	53
Malaria	55
Strongyloidiasis	57

Respiratory Diseases	59
Other Diseases.....	60
Invasive Beta-hemolytic Streptococcal Disease	61
Appendix A – Reportable Diseases List, 2014.....	63
Appendix B – Laboratory-confirmed, reportable diseases present in Manitoba, in 2014, ranked by case count.....	67

LIST OF FIGURES

Figure 1: Number of laboratory-confirmed <i>Clostridium difficile</i> cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=881)	18
Figure 2: Number of laboratory-confirmed <i>Clostridium difficile</i> cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	19
Figure 3: <i>Clostridium difficile</i> incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014.....	19
Figure 4: Number of laboratory-confirmed methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=4,928).....	20
Figure 5: Number of laboratory-confirmed methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013).....	21
Figure 6: Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014.....	21
Figure 7: Number of laboratory-confirmed vancomycin resistant <i>Enterococci</i> (VRE) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=1,576).....	22
Figure 8: Number of laboratory-confirmed vancomycin resistant <i>Enterococci</i> (VRE) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	23
Figure 9: Vancomycin resistant <i>Enterococci</i> (VRE) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	23
Figure 10: Number of laboratory-confirmed amebiasis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	26
Figure 11: Number of laboratory-confirmed campylobacteriosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=170)	27
Figure 12: Number of laboratory-confirmed campylobacteriosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	28
Figure 13: Campylobacteriosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014.....	28
Figure 14: Number of laboratory-confirmed cryptosporidiosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=113)	29
Figure 15: Number of laboratory-confirmed cryptosporidiosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	30

Figure 16: Cryptosporidiosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	30
Figure 17: Number of laboratory-confirmed giardiasis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=86)	31
Figure 18: Number of laboratory-confirmed giardiasis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	32
Figure 19: Giardiasis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	32
Figure 20: Number of laboratory-confirmed salmonellosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=229)	35
Figure 21: Number of laboratory-confirmed salmonellosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	36
Figure 22: Salmonellosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	36
Figure 23: Number of laboratory-confirmed shigellosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=35)	37
Figure 24: Number of laboratory-confirmed shigellosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	38
Figure 25: Shigellosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	38
Figure 26: Number of laboratory-confirmed verotoxigenic <i>Escherichia coli</i> (VTEC) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=35)	39
Figure 27: Number of laboratory-confirmed verotoxigenic <i>Escherichia coli</i> (VTEC) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	40
Figure 28: Verotoxigenic <i>Escherichia coli</i> (VTEC) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	40
Figure 29: Number of laboratory-confirmed invasive pneumococcal disease (IPD) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=135)	44
Figure 30: Number of laboratory-confirmed invasive pneumococcal disease (IPD) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	45
Figure 31: Invasive pneumococcal disease (IPD) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	45
Figure 32: Number of laboratory-confirmed Lyme disease cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	54
Figure 33: Lyme disease incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	54
Figure 34: Malaria incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	56
Figure 35: Strongyloidiasis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	58

Figure 36: Number of laboratory-confirmed invasive beta-hemolytic streptococcal disease cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=280).....	61
Figure 37: Number of laboratory-confirmed invasive beta-hemolytic streptococcal disease cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013).....	62
Figure 38: Invasive beta-hemolytic streptococcal disease incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014	62

LIST OF TABLES

Table 1: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each disease, infection, and/or organism confirmed and reported in Manitoba, 2014 and 5-year average (2009-2013)	14
Table 2: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each nosocomial and/or antibiotic resistant organism confirmed in Manitoba, 2009-2014	17
Table 3: Number of laboratory-confirmed <i>Clostridium difficile</i> cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	18
Table 4: Number of laboratory-confirmed methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013).....	20
Table 5: Number of laboratory-confirmed vancomycin resistant <i>Enterococci</i> (VRE) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013).....	22
Table 6: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each enteric diseases (or illness) confirmed in Manitoba, 2009-2014	24
Table 7: Number of laboratory-confirmed amebiasis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	25
Table 8: Number of laboratory-confirmed amebiasis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=29)	25
Table 9: Number of laboratory-confirmed campylobacteriosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	27
Table 10: Number of laboratory-confirmed cryptosporidiosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	29
Table 11: Number of laboratory-confirmed giardiasis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	31
Table 12: Number of laboratory-confirmed hepatitis A cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	33
Table 13: Number of laboratory-confirmed hepatitis A cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=8)	33

Table 14: Number of laboratory-confirmed hepatitis A cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	34
Table 15: Number of laboratory-confirmed salmonellosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	35
Table 16: Number of laboratory-confirmed shigellosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	37
Table 17: Number of laboratory-confirmed verotoxigenic <i>Escherichia coli</i> (VTEC) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	39
Table 18: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each vaccine preventable disease (VPD) confirmed in Manitoba, 2009-2014	41
Table 19: Number of laboratory-confirmed invasive <i>Haemophilus influenzae</i> disease cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	42
Table 20: Number of laboratory-confirmed invasive <i>Haemophilus influenzae</i> disease cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=10)	43
Table 21: Number of laboratory-confirmed invasive <i>Haemophilus influenzae</i> disease cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	43
Table 22: Number of laboratory-confirmed invasive pneumococcal disease (IPD) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	44
Table 23: Number of laboratory-confirmed measles cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	46
Table 24: Number of laboratory-confirmed measles cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=9)	47
Table 25: Number of laboratory-confirmed measles cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	47
Table 26: Number of laboratory-confirmed pertussis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	48
Table 27: Number of laboratory-confirmed pertussis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=13)	49
Table 28: Number of laboratory-confirmed pertussis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	49
Table 29: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each zoonotic disease and environmental disease confirmed in Manitoba, 2009-2014	50

Table 30: Number of laboratory-confirmed blastomycosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	51
Table 31: Number of laboratory-confirmed blastomycosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=15).....	51
Table 32: Number of laboratory-confirmed blastomycosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013).....	52
Table 33: Number of laboratory-confirmed Lyme disease cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	53
Table 34: Number of laboratory-confirmed Lyme disease cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=21)	53
Table 35: Number of laboratory-confirmed malaria cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	55
Table 36: Number of laboratory-confirmed malaria cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=20)	56
Table 37: Number of laboratory-confirmed malaria cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)	56
Table 38: Number of laboratory-confirmed strongyloidiasis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	57
Table 39: Number of laboratory-confirmed strongyloidiasis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=22).....	57
Table 40: Number of laboratory-confirmed strongyloidiasis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013).....	58
Table 41: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each respiratory disease confirmed in Manitoba, 2009-2014.....	59
Table 42: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each 'other' disease confirmed in Manitoba, 2009-2014.....	60
Table 43: Number of laboratory-confirmed invasive beta-hemolytic streptococcal disease cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)	61
Table 44: Reportable Diseases List, 2014	63
Table 45: The number of laboratory-confirmed cases, incidence rates (per 100,000 persons), and proportion of total case count for each reportable disease, infection, and/or organism confirmed in Manitoba, in 2014, ranked by case count	67

Abbreviations

IMD	Invasive Meningococcal Disease
IPD	Invasive Pneumococcal Disease
MHLS	Manitoba Health, Healthy Living and Seniors
MRSA	Methicillin-Resistant <i>Staphylococcus aureus</i>
RHA	Regional Health Authority
Staph.	Staphylococcus
Strep.	Streptococcal
STBI	Sexually Transmitted and Blood-Borne Infections
STSS	Streptococcal Toxic Shock Syndrome
VRE	Vancomycin Resistant Enterococci
VTEC	Verotoxigenic <i>Escherichia coli</i>

Regional Health Authorities

Winnipeg RHA	Winnipeg Regional Health Authority (includes Churchill)
Southern Health – Santé Sud	Southern Health – Santé Sud
Interlake-Eastern RHA	Interlake-Eastern Regional Health Authority
Prairie Mountain Health	Prairie Mountain Health
Northern RHA	Northern Regional Health Authority

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2014 Highlights

Nosocomial and Antibiotic Resistant Organisms

- The 2014 incidence rate (377.2 cases per 100,000 persons) of **methicillin-resistant *Staphylococcus aureus* (MRSA)** was higher than the 5-year average incidence rate (285.2 cases per 100,000 persons). The incidence rate of MRSA in Northern RHA was up to 28 times higher than the incidence rates in the other four regions, in 2014; the incidence of MRSA increased in all regions between 2009 and 2014. More evidence is needed to determine whether this was a true increase in the number of cases of MRSA, or whether it was an increase in the number of cases being reported, due to increased testing.

Enteric Diseases

- Higher than expected **cryptosporidiosis** case counts were observed during a ten-week period in late Summer/early Fall 2014. There were 26 laboratory-confirmed cases with specimens collected between August 1 and November 24, 2014 but, no common source or exposure was identified. Expected levels of cryptosporidiosis were reported during the rest of 2014, bringing the total case count to 113. This increase in cases resulted in the 2014 incidence rate being approximately three-times greater than the 5-year average incidence rate (9.7 cases per 100,000 persons compared to 2.6 cases per 100,000 persons).

Vaccine Preventable Diseases

- In 2014, there were nine laboratory-confirmed **measles** cases in Manitoba. The relatively-high case count in 2014 was due to an outbreak which occurred in the spring of 2014. Eight of the nine laboratory-confirmed cases in 2014 occurred between the beginning of March and the end of April—the ninth case occurred in August (imported case). The Winnipeg RHA experienced the highest number of cases with six laboratory-confirmed cases (2.8 cases per 100,000 persons) but had the same incidence of Interlake-Eastern RHA (2.8 cases per 100,000 persons) which had just one laboratory-confirmed case. Prairie Mountain Health and Northern RHA had no laboratory-confirmed cases of measles in 2014. Despite measles being a “childhood” disease, the majority of cases (six of nine) occurred in adults over the age of 19.

Zoonotic and Environmental Diseases

- Southern Health-Santé Sud carried the largest burden of **Lyme disease** (13 cases in total, or 6.8 cases per 100,000 persons, in 2014), compared to the other RHAs; Southern Health-Santé Sud's incidence rate increased by about 6 cases per 100,000 persons between 2009 and 2013, but held constant from 2013 to 2014. The other RHA's incidence rates remained fairly constant over all six years. Northern RHA had no cases of Lyme disease from 2009 to 2014.

Other Diseases

- Northern RHA had the highest incidence of **invasive beta-hemolytic streptococcal disease** of all the RHAs, between 2009 and 2014. The incidence rate in 2014 was 45.1 cases per 100,000 persons. Winnipeg RHA had the second highest incidence rate from 2009 to 2013 but, in 2014, Interlake-Eastern RHA had the second highest incidence rate with 34.5 cases per 100,000 persons.

Introduction

This report, *Manitoba Annual Summary of Communicable Diseases (2014)*, provides a summary of laboratory-confirmed, communicable diseases in Manitoba, for the year 2014. It focuses specifically on infectious diseases listed as "reportable" under *The Public Health Act* with the exception of influenza, tuberculosis, West Nile virus, and the sexually transmitted and blood-borne infections – these diseases appear in other annual reports produced by Manitoba Health, Healthy Living and Services (MHLS) (for a list of all diseases that were reportable in Manitoba, in 2014, see Appendix A).

The goal of this report is to provide a summary of laboratory-confirmed, reportable, communicable diseases in Manitoba for the year 2014. The information in this report can be used to identify potential emerging issues and evaluate the effect of policies and programs. It can also be used by the regional health authorities (RHAs) to better understand the burden of disease in their jurisdictions.

The diseases in this report are divided into six main categories:

1. zoonotic and antibiotic resistant organisms,
2. enteric diseases,
3. vaccine preventable diseases,
4. zoonotic and environmental diseases,
5. respiratory diseases, and
6. "other" diseases (those diseases which do not fall in one of the first five categories).

Case counts and incidence rates for each disease with **greater than five** cases in 2014 are presented by:

- sex, with age analysis (2014 and the 5-year average (2009-2013)),
- age group and sex (2014), and
- RHA (2014 and the 5-year average (2009-2013)).

Incidence rates for each disease with **greater than 15** cases in 2014 are also presented by:

- RHA (2009-2014).

Methods

Only those laboratory-confirmed¹ communicable diseases which occurred in individuals between January 1st, 2008 and December 31st, 2011, and whose exposure to WHHIS before the date of date of diagnosis, will be included in the report. Theoretical the report, the 2011 date was compared to the date of the previous 5 years (i.e. the date of the 5-year exposure [2008-2011]) or year-by-year from 2008 to 2011), when the comparison was deemed valuable.

When 5-year exposure was compared, rounded-up was determined to ensure the case counts provided were whole numbers.

- Diseases case counts **greater than 1000** (e.g. 200.2, 1.2, 0.5) were rounded up to the next whole number (e.g. 201, 2, 1).
- Diseases case counts **less than 1000** (e.g. 1.2, 1.2, 1.5) were rounded to the nearest 10^{-1} value.

The incidence rates in the 5-year exposure were calculated using the **unrounded** 5-year exposure case count. Due to this, there may be some variability in incidence rates for case counts that appear the same after rounding. In addition, due to rounding, the total number of cases in the 5-year exposure may not equal the sum of the rounded female and male counts, or the sum of the rounded WHHIS counts.

Incidence rates were calculated using the WHHIS population file which provides the mid-year population count as of June 1 of that year. All rates are crude incidence rates calculated as the number of cases (numerator) divided by the population of the age-gender group specified (denominator) and multiplied by 100,000 to produce the number of reported cases per 100,000 persons. That is, the number of cases per 100,000 individuals in that population. For example, the incidence rates for males in the 15-19 age group were calculated with a numerator of the number of males aged 15-19 who had laboratory-confirmed cases of the specific disease, and a denominator of the total number of males in Quebec aged 15-19 years old in June of that year. The average incidence rates were calculated with a numerator of the average number of cases from 2008-2011, and a denominator of the average population of the age-gender group specified, from 2008-2011.

When comparing incidence rates, and especially when comparing case counts between WHHIS, it is important to keep in mind that the differing population counts between regions can contribute to an incidence rate that looks conspicuously large even when there are only a few cases, or an incidence rate that appears small even when there are many cases. For example, Northam WHHIS may experience large changes in incidence when there are small changes in the case count, due to its small population; the opposite goes for the Winnipeg WHHIS. The same concept applies for the age groups; a small change in case counts in the 0-1 and 1-4 age groups (that have small populations) makes a larger difference than the same change in case counts in the 15-19 and over 65 age groups (that have large populations).

¹ Laboratory confirmed means there was a valid laboratory test performed for the specific disease, as recommended in the WHHIS, Communicable Disease Control (CDC), Communicable Disease Management Protocol (<http://www.gov.mb.ca/health/publichealth/cdc/protocol/mcm.html>), and a positive test result was obtained. That is, the case tested positive for the disease. Clinically diagnosed cases are not included in the report.

Regional comparisons were reported based on the case's region of residence, not on the region in which the case was tested and/or diagnosed. Thus, data for those individuals who were tested in Switzerland, but lived outside of the province, were not included in this report.

When performed, the age analysis provides the average age, median age, standard deviation of age, minimum age, and maximum age of the people who were confirmed to have the disease.

Notes:

- a. Any disease with less than or equal to five cases in 2012 did not have a detailed analysis performed. Information for these diseases was only included in the comparison tables both at the beginning of the report, and in the disease category in which the disease belongs, denoted by an asterisk (*).
- b. For the purpose of this report, a "disease of rare occurrence" was defined as any disease with less than or equal to 12 cases in 2012, and denoted by a superscript 3 (*). In the comparison tables, for diseases of rare occurrence graphical analysis was not meaningful and was not included.

The surveillance data used in this report were extracted on July 2nd, 2012 (all diseases except for Neonatal and Infective Resistant Organisms) and September 2nd, 2012 (the Neonatal and Infective Resistant Organisms) from the Communicable Diseases Control Surveillance Database housed by WHOCC.

In many areas of this report, rates were calculated for case counts less than and equal to five. It is important to remember that these rates are not statistically robust (they are unreliable due to the instability of small numbers) and they should not be used for policy planning or other decision making purposes.

About Surveillance Data

Surveillance data in Manitoba are routinely collected under *The Public Health Act* and are subject to certain limitations. Often, the number of reported cases of any disease is a fraction of the actual count. Individuals may not seek medical care for "mild" symptoms; if they do, the doctor may not order a lab test to confirm the disease. In addition, surveillance data results can be skewed as doctors may be more likely to order tests for severe diseases or those diseases which pose a danger to public health. The amount of testing and reporting performed can be influenced by many factors (e.g., outbreaks, policy changes). Increased reporting can make it appear as though there has been an increase in the number of cases in a community, while the actual number of cases remains constant (and vice versa).

Surveillance data are also influenced by changes in testing practices (e.g., universal screening for an organism upon admission to health facilities), laboratory capacity (e.g., only testing a certain proportion of influenza cases during a known outbreak) and changes in lab technology (e.g., more sensitive diagnosis). All of these factors must be considered when drawing conclusions about surveillance data.

It is especially important to consider these limitations in two situations:

1. When comparing RHA incidence rates and case counts. It is not uncommon for there to be variation in the number of cases tested and sent for laboratory confirmation between the RHAs.
2. When identifying increasing or decreasing trends in a disease. It is important to remember this may not be a true reflection of increasing or decreasing case counts and incidence rates. Further investigation and evidence collection is required to determine whether the increase or decrease is caused by a "true" change in disease incidence, or by a change in reporting practices.

Reportable Diseases Present in Manitoba

Table 1: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each disease, infection, and/or organism confirmed and reported in Manitoba, 2014 and 5-year average (2009-2013)

Disease Name	2014		2009-2013 Average	
	Case Count	Incidence (95% C.I.)	Case Count	Incidence (95% C.I.)
Nosocomial and Antibiotic Resistant Organisms				
<i>Clostridium difficile</i> Infection	861	67.4 (63.1, 72.0)	847	67.6 (63.1, 72.3)
Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)	4928	377.2 (366.8, 387.9)	3569	285.2 (275.9, 294.7)
Vancomycin Resistant <i>Enterococci</i> (VRE)	1576	120.6 (114.8, 126.8)	903	72.1 (67.5, 77.0)
Enteric Diseases				
Amoebiasis	20	2.2 (1.5, 3.2)	33	2.6 (1.8, 3.7)
<i>Bacillus cereus</i> food poisoning*	0	0 (0.0, 0.3)	2	0.1 (0.0, 0.4)
Campylobacteriosis	170	13 (11.1, 15.1)	247	19.7 (17.3, 22.3)
Cholera*	0	0 (0.0, 0.3)	0-1	0 (0.0, 0.3)
<i>Clostridium perfringens</i> *	3	0.2 (0.0, 0.7)	4	0.3 (0.0, 0.7)
Cryptosporidiosis	113	8.7 (7.1, 10.4)	33	2.6 (1.8, 3.6)
Cyclosporiasis*	5	0.4 (0.1, 0.9)	2	0.1 (0.0, 0.4)
Giardiasis	86	6.6 (5.3, 8.1)	115	9.1 (7.5, 11.0)
Hepatitis A [†]	8	0.6 (0.3, 1.2)	9	0.7 (0.3, 1.3)
Listeriosis*	2	0.2 (0.0, 0.6)	4	0.3 (0.0, 0.7)
Paratyphoid*	4	0.3 (0.1, 0.8)	5	0.4 (0.1, 0.9)
Salmonellosis	229	17.5 (15.3, 20.0)	215	17.1 (14.9, 19.6)
Shigellosis	36	2.7 (1.9, 3.7)	41	3.2 (2.4, 4.5)
Verotoxigenic <i>Escherichia coli</i> (VTEC)	36	2.7 (1.9, 3.7)	49	3.9 (2.8, 5.1)
<i>Vibrio Parahaemolyticus</i> *	0	0 (0.0, 0.3)	2	0.1 (0.0, 0.4)
Yersiniosis*	1	0.1 (0.0, 0.4)	8	0.6 (0.3, 1.3)
Vaccine Preventable Diseases				
Diphtheria*	0	0 (0.0, 0.3)	0-1	0 (0.0, 0.4)
Invasive <i>Haemophilus influenzae</i> Disease (IHD) [‡]	10	0.8 (0.4, 1.4)	13	1 (0.5, 1.7)
Invasive Meningococcal Disease (IMD)*	3	0.2 (0.0, 0.7)	6	0.5 (0.2, 1.0)
Invasive Pneumococcal Disease (IPD)	135	10.3 (8.7, 12.2)	146	11.6 (9.8, 13.6)
Measles [‡]	9	0.7 (0.3, 1.3)	0-1	0 (0.0, 0.3)
Mumps*	0	0 (0.0, 0.3)	4	0.3 (0.1, 0.8)
Pertussis [‡]	13	1 (0.5, 1.7)	48	3.8 (2.8, 5.1)
Rubella, confirmed*	0	0 (0.0, 0.3)	1	0.1 (0.0, 0.4)
Rubella, congenital*	0	0 (0.0, 0.3)	0-1	0 (0.0, 0.3)
Typhoid*	1	0.1 (0.0, 0.4)	6	0.4 (0.2, 1.0)

Note: Confidence intervals in *italics* are one-sided, 97.5% confidence intervals. All other confidence intervals are two-sided 95% confidence intervals.

* Disease with a case count ≤ 5 in 2014; will not have a detailed analyses performed

† Disease of rare occurrence

Disease Name	2014		2009-2013 Average	
	Case Count	Incidence (95% C.I.)	Case Count	Incidence (95% C.I.)
Zoonotic and Environmental Diseases				
Blastomycosis ^R	15	1.1 (0.6, 1.9)	12	0.9 (0.4, 1.6)
Brucellosis*	1	0.1 (0.0, 0.4)	2	0.1 (0.0, 0.6)
Dengue*	2	0.2 (0.0, 0.6)	4	0.3 (0.1, 0.8)
<i>Diphyllobothrium latum</i> *	4	0.3 (0.1, 0.8)	9	0.7 (0.3, 1.3)
Hantavirus*	0	0 (0.0, 0.3)	0 - 1	0 (0.0, 0.3)
Legionellosis*	2	0.2 (0.0, 0.6)	4	0.3 (0.0, 0.7)
Lyme	21	1.6 (1.0, 2.5)	8	0.6 (0.3, 1.3)
Malaria	20	1.5 (0.9, 2.4)	18	1.4 (0.8, 2.2)
Q. Fever*	0	0 (0.0, 0.3)	0 - 1	0 (0.0, 0.4)
Rickettsial Disease, Other*	0	0 (0.0, 0.3)	0 - 1	0 (0.0, 0.3)
Strongyloidiasis	22	1.7 (1.1, 2.6)	23	1.8 (1.2, 2.8)
Toxoplasmosis*	0	0 (0.0, 0.3)	3	0.2 (0.0, 0.7)
Trichinosis*	0	0 (0.0, 0.3)	0 - 1	0.1 (0.0, 0.4)
Trypanosomiasis*	2	0.2 (0.0, 0.6)	4	0.3 (0.0, 0.7)
Tularemia*	2	0.2 (0.0, 0.6)	1.4	0.1 (0.0, 0.4)
Respiratory Diseases				
Leprosy*	1	0.1 (0.0, 0.4)	0	0 (0.0, 0.3)
Parapertussis*	4	0.3 (0.1, 0.8)	2	0.1 (0.0, 0.6)
Other Diseases				
Creutzfeldt-Jakob Disease (C.J.D.)*	1	0.1 (0.0, 0.4)	1	0.1 (0.0, 0.4)
Invasive Beta-hemolytic Streptococcal Disease	280	21.4 (19, 24.1)	273	21.8 (19.3, 24.6)
Necrotizing Fasciitis*	5	0.4 (0.1, 0.9)	8	0.6 (0.3, 1.3)
<i>Staphylococcus aureus</i> (Toxic Shock)*	1	0.1 (0.0, 0.4)	0	0 (0.0, 0.3)
Streptococcal Glomerulonephritis*	0	0 (0.0, 0.3)	0 - 1	0 (0.0, 0.3)
Streptococcal Toxic Shock Syndrome (STSS)*	2	0.2 (0.0, 0.6)	2	0.1 (0.0, 0.4)
Viral Hepatitis, Other*	2	0.2 (0.0, 0.6)	3	0.2 (0.0, 0.6)

Note: Confidence intervals in *italics* are one-sided, 97.5% confidence intervals. All other confidence intervals are two-sided 95% confidence intervals.

* Disease with a case count ≤ 5 in 2014; will not have a detailed analyses performed

^R Disease of rare occurrence

Table 1 includes only those laboratory-confirmed, reportable diseases *reported* in Manitoba, between 2009 and 2014. Any reportable disease that is within the scope of the report, but is not shown in Table 1, had **zero cases reported between 2009 and 2014**. These are:

- Anthrax
- Botulism
- Encephalitis
- Hemolytic Uremic Syndrome (HUS)
- Parrot Fever (Psittacosis)
- Penicillin resistant pneumococci
- Plague (*Yersinia pestis*)
- Rabies
- Relapsing Fever
- Rocky Mountain Spotted Fever
- Severe Acute Respiratory Syndrome (SARS)
- Severe Respiratory Illness (SRI)
- Smallpox
- Necrotizing Myositis
- Typhus
- Vancomycin Resistant *Staphylococcus aureus* (VRSA)
- Viral Hemorrhagic Fever (including Crimean Congo, Lassa, Ebola, Marburg and Rift Valley viruses)
- Western Equine Encephalitis
- Yellow Fever

Nosocomial and Antibiotic Resistant Organisms

Nosocomial infections, or "hospital-acquired infections", are infections acquired during hospital care, which are not present, or incubating, at admission. Antibiotic resistant organisms (AROs) are organisms that have developed resistance to one or more antibiotics. From 2009 to 2014, there were three organisms in this category under surveillance in Manitoba: *Clostridium difficile* infection, methicillin-resistant *Staphylococcus aureus* (MRSA), and vancomycin resistant *Enterococci* (VRE). Nosocomial and AROs accounted for 85.2% of all reportable disease cases in this report (Appendix B).

Note that MHHLS's surveillance data, as collected, does not differentiate between MRSA infections and MRSA colonisations and there is no distinction made between community and hospital-acquired strains. VRE data are also undifferentiated by infection versus colonization.

Table 2: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each nosocomial and/or antibiotic resistant organism confirmed in Manitoba, 2009-2014

Disease Name	2009		2010		2011		2012		2013		2014	
	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence
<i>Clostridium difficile</i> Infection	840	69.2	822	66.8	906	72.5	807	63.5	856	66.4	881	67.4
Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)	2,800	230.6	3,417	277.7	3,311	264.8	3,908	307.4	4,405	341.7	4,928	377.2
Vancomycin Resistant <i>Enterococci</i> (VRE)	94	7.7	342	27.8	1,245	99.6	1,443	113.5	1,389	107.7	1,576	120.6

Clostridium difficile Infection

The incidence rate of *Clostridium difficile* infection in 2014 (67.4 cases per 100,000 persons) was very close to the incidence rate of the infection in the 5-year average (67.6 cases per 100,000 persons) (Table 3). *Clostridium difficile* infection was predominantly seen in people over the age of 60; Table 3 shows the average age of infection in 2014 was 62.9 years. This is reflected in Figure 1, where females over the age of 60 experienced 204.0 cases per 100,000 persons and males experienced 197.9 cases per 100,000 persons in 2014. Of the diseases included in this report, *Clostridium difficile* infection had the third highest incidence rate in 2014, and accounted for 10.2% of the total cases in this report (881 cases of 8,665 cases) (Appendix B).

Table 3: Number of laboratory-confirmed *Clostridium difficile* cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	881	67.4	847	67.6
Female	488	74.1	488	77.0
Male	393	60.6	359	58.0
	Age Analysis (in years)		Age Analysis (in years)	
Average	62.9		65.3	
Median	67.2		69.2	
St. Dev.	22.6		21.1	
Min. Age	0.0		0.0	
Max. Age	101.1		103.0	

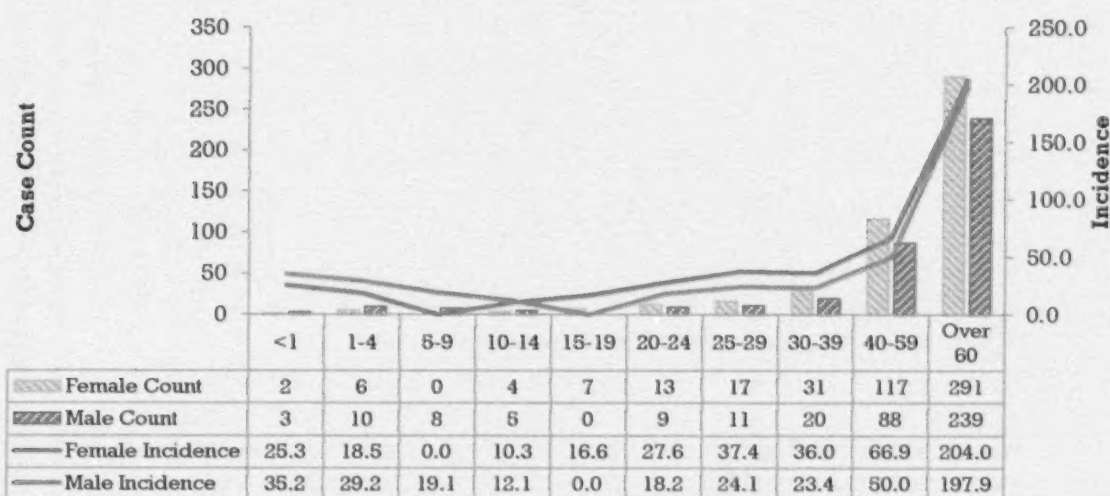


Figure 1: Number of laboratory-confirmed *Clostridium difficile* cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=881)

In 2014 and the 5-year average, Prairie Mountain Health had the highest incidence rate of *Clostridium difficile* infection with 96.5 cases per 100,000 persons, and 85.2 cases per 100,000 persons, respectively (Figure 2). The lowest incidence rate was in Northern RHA with 34.5 cases per 100,000 persons. Figure 3 shows Northern RHA consistently had the lowest rate of *Clostridium difficile* infection across all six years, while Prairie Mountain Health had the highest rate of *Clostridium difficile* infection in five out of the six years.

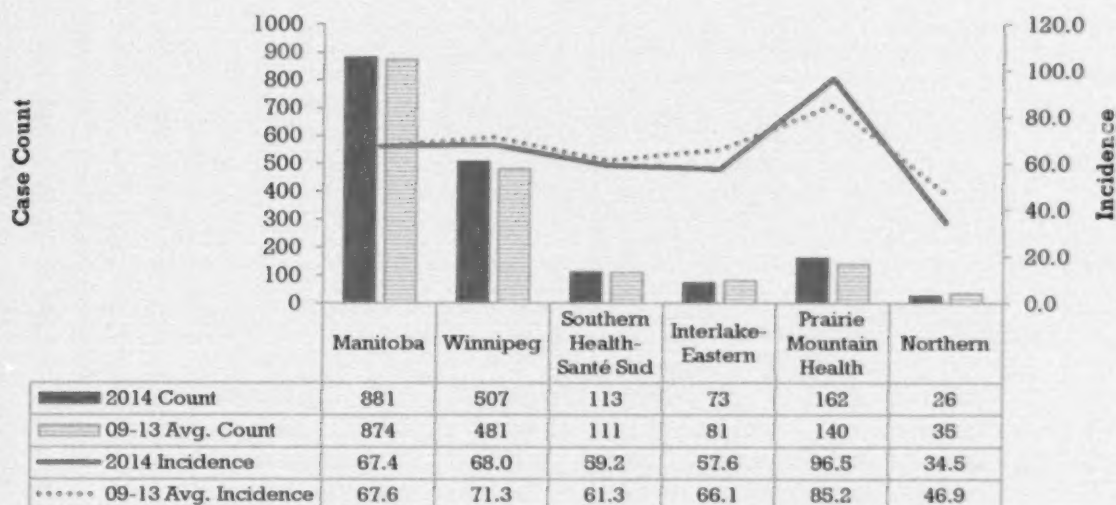


Figure 2: Number of laboratory-confirmed *Clostridium difficile* cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

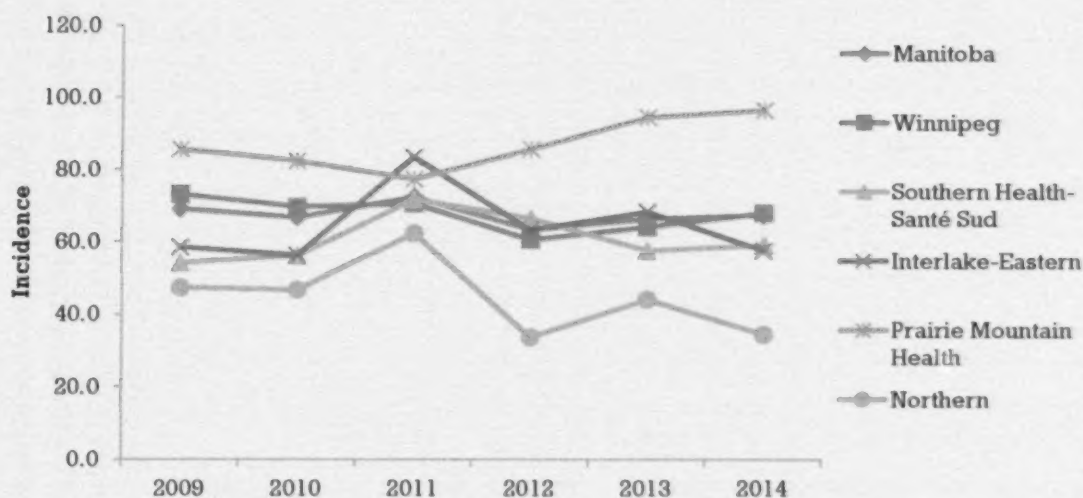


Figure 3: *Clostridium difficile* incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

In 2014, MRSA had the highest incidence (377.2 cases per 100,000 persons) of all the reportable diseases in this report, accounting for 56.9% of the total number of cases in this report (4,928 cases of 8,665 total cases) (Appendix B). MRSA is actively screened for in hospitals settings – a screening process that does not take place for many other organisms. This may have contributed to the high incidence rates of MRSA. The 2014 incidence rate (377.2 cases per 100,000 persons) of MRSA was higher than the 5-year average incidence rate (285.2 cases per 100,000 persons) (Table 4). Figure 4 shows the highest incidence of MRSA occurred in children less than one-year old (1,076.4 cases per 100,000 persons for females and 1,362.1 cases per 100,000 persons for males).

Table 4: Number of laboratory-confirmed methicillin-resistant *Staphylococcus aureus* (MRSA) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

15)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	4,928	377.2	3,569	285.2
Female	2,434	369.8	1,759	278.1
Male	2,494	384.8	1,810	292.5
	Age Analysis (in years)		Age Analysis (in years)	
Average	37.2		36.4	
Median	34.8		32.4	
St. Dev.	26.0		26.9	
Min. Age	0.0		0.0	
Max. Age	102.5		105.3	

Note: six cases with unknown ages were left out of the 2009-2013 average age analysis.



Figure 4: Number of laboratory-confirmed methicillin-resistant *Staphylococcus aureus* (MRSA) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=4,928)

In 2014, the incidence rate of MRSA in Northern RHA was eight times higher than the provincial incidence rate, and up to 29 times higher than the incidence rates in the other four regions (Figure 5). Figure 6 shows Northern RHA consistently had higher incidence rates than the rest of the province, from 2009 to 2014. The incidence of MRSA increased in all regions between 2009 and 2014. More evidence is needed to determine whether this was a true increase in the number of cases of MRSA, or whether it was an increase in the number of cases being reported, due to increased testing.

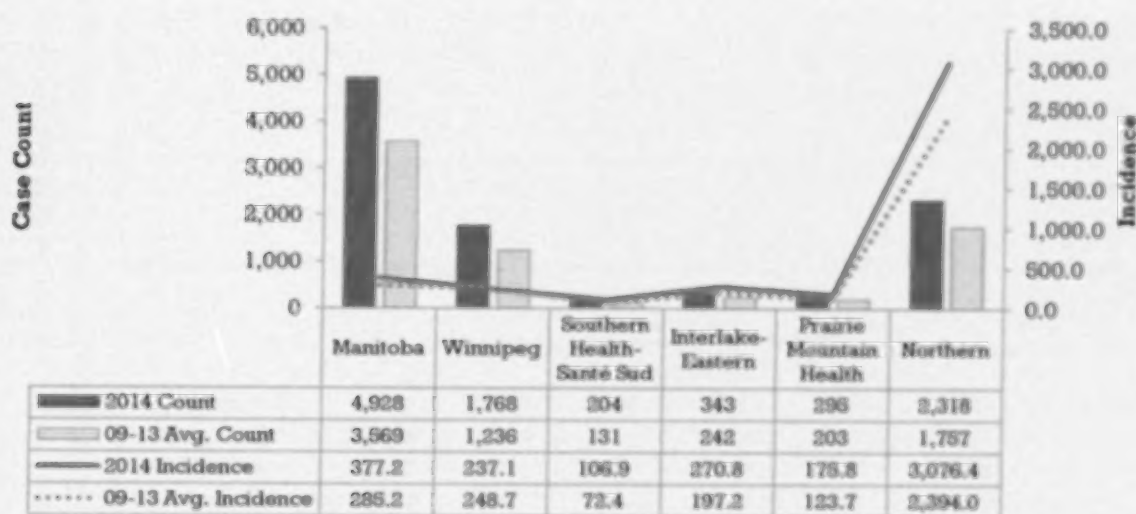


Figure 5: Number of laboratory-confirmed methicillin-resistant *Staphylococcus aureus* (MRSA) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

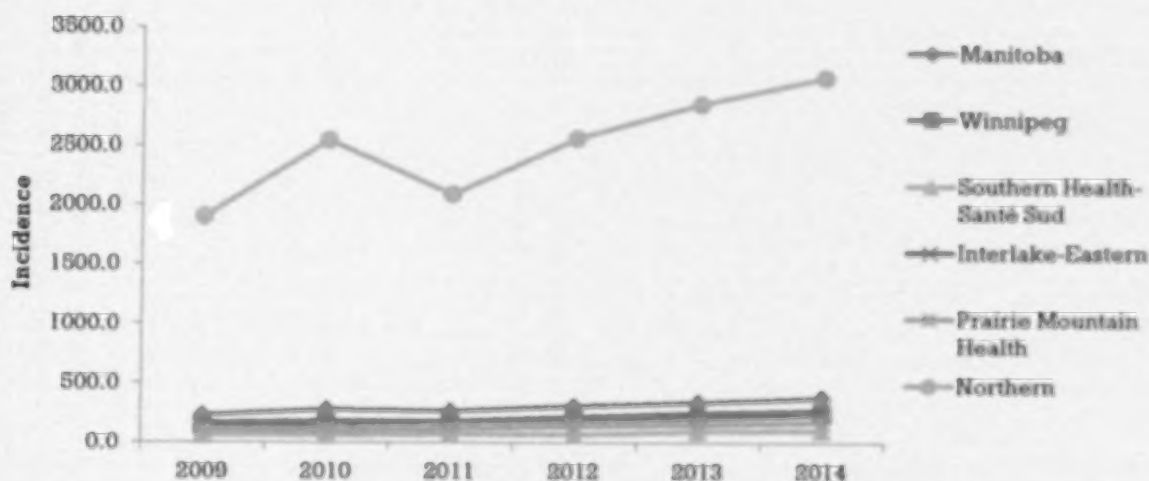


Figure 6: Methicillin-resistant *Staphylococcus aureus* (MRSA) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Vancomycin Resistant *Enterococci* (VRE)

The incidence rate of VRE in 2014 was approximately one and one-half times greater than the incidence of VRE in the 5-year average (120.6 cases per 100,000 persons compared to 72.1 cases per 100,000 persons) (Table 5). VRE predominantly affected people ages 40-59 and ages 60 years and over in 2014. Figure 7 shows the incidence rates of those over the age of 60 were about four times greater than the incidence rates of those with the second highest incidence rates (40-59 year olds). Of the diseases included in this report, VRE had the second highest incidence rate in 2014, and accounted for 18.2% of the total number of cases in this report (1,576 cases of 8,665 cases) (Appendix B).

Table 5: Number of laboratory-confirmed vancomycin resistant *Enterococci* (VRE) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	1,576	120.6	903	72.1
Female	750	113.9	461	72.7
Male	826	127.4	443	71.5
	Age Analysis (in years)		Age Analysis (in years)	
Average	66.8		69.0	
Median	69.2		71.6	
St. Dev.	18.8		17.6	
Min. Age	0.0		0.0	
Max. Age	103.2		101.7	

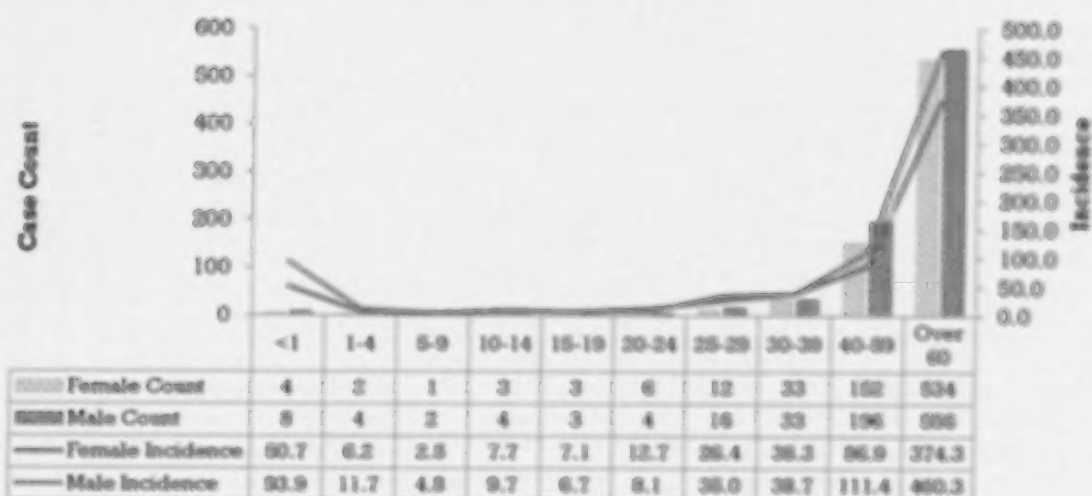


Figure 7: Number of laboratory-confirmed vancomycin resistant *Enterococci* (VRE) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=1,576)

Southern Health - Santé Sud had the lowest VRE incidence rate of all the RHAs, with 77.0 cases per 100,000 persons, in 2014 (Figure 8). The highest incidence rate was experienced by Northern RHA with 234.9 cases per 100,000 persons, an incidence rate almost three times its 5-year average incidence rate. All RHAs (with the exception of Winnipeg RHA, whose 2014 incidence rate and 5-year average incidence rate were similar) experienced a higher 2014 incidence rate than their 5-year average incidence rate. The VRE incidence rates increased in all RHAs between 2009 and 2014 (Figure 9); this trend was also seen nationally².

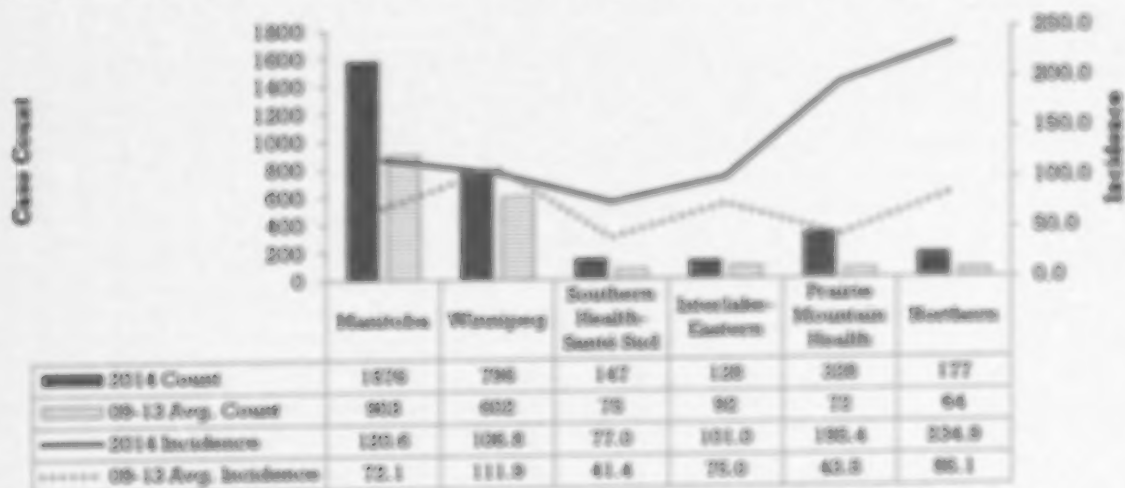


Figure 8: Number of laboratory-confirmed vancomycin resistant *Enterococci* (VRE) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

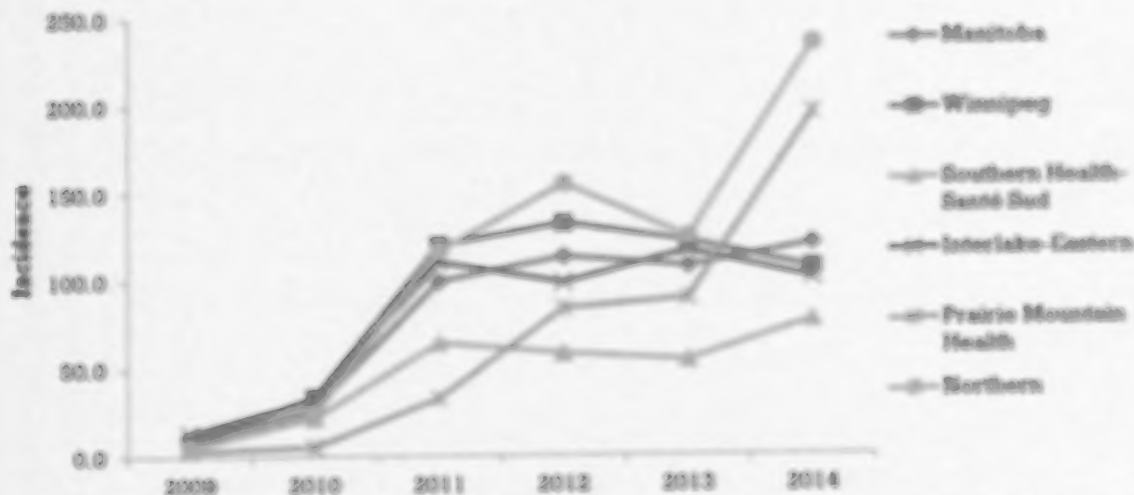


Figure 9: Vancomycin resistant *Enterococci* (VRE) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

² Public Health Agency of Canada. *Antimicrobial Resistant Organisms (ARO) Surveillance: Surveillance Report for Data from January 1, 2009 to June 30, 2014*. Accessed: September 1, 2015. <http://www.phac-aspc.gc.ca/nois-sinp/projects/aro-mra-eng.php#b03>

Enteric Diseases

Enteric disease (or illness) is defined as gastrointestinal infection or intoxication. This report includes only those enteric diseases caused by reportable microorganisms such as: bacteria, viruses, and parasites. Enteric diseases are widely under-reported due to no or mild symptoms, short duration, lack of a physician visit, and the absence of laboratory diagnosis even when attending a physician¹. Table 6 shows there were 13 enteric diseases reported to MDDLS in 2014. Salmonellosis had the highest incidence rate in 2014 with 17.8 cases per 100,000 persons in the province; campylobacteriosis had the second highest incidence rate in 2014 with 13.0 cases per 100,000 persons in the province.

Table 6: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each enteric disease (or illness) confirmed in Manitoba, 2009-2014

Disease Name	2009		2010		2011		2012		2013		2014	
	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence
Amebiasis	43	2.2	34	2.0	29	2.2	40	2.1	17	1.2	29	2.0
Bacillus cereus food poisoning*	6	0.4	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0
Campylobacteriosis	238	18.4	245	18.9	290	23.2	250	18.7	210	16.2	170	13.0
Cholera*	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0
Clostridium perfringens*	3	0.2	1	0.1	4	0.3	2	0.2	7	0.5	3	0.2
Cryptosporidiosis	39	2.1	23	1.8	19	1.5	41	3.2	40	3.1	113	8.7
Cyclosporiasis*	1	0.1	1	0.1	2	0.2	0	0.0	2	0.2	5	0.4
Giardiasis	129	10.6	123	10.0	116	9.3	113	8.9	99	7.8	88	6.8
Hepatitis A ²	11	0.9	6	0.7	7	0.6	4	0.3	11	0.9	6	0.6
Listeriosis*	2	0.2	4	0.3	5	0.4	4	0.3	2	0.2	2	0.2
Paratyphoid*	2	0.2	5	0.4	4	0.3	7	0.6	7	0.5	4	0.3
Salmonellosis	261	21.5	234	18.0	174	13.9	178	13.9	227	17.8	229	17.8
Shigellosis	24	2.0	52	4.2	29	2.3	75	5.9	23	1.8	35	2.7
Yersinia enterocolitica Escherichia coli (YTEC)	43	2.7	76	6.2	38	4.5	36	2.8	29	2.3	35	2.7
Vibrio Parasaccharomyces*	0	0.0	3	0.2	0	0.0	2	0.2	2	0.2	0	0.0
Yersinia*	8	0.7	7	0.6	11	0.9	9	0.7	5	0.4	1	0.1

* Disease with a case count ≤ 5 in 2014, with not have a detailed analysis performed

² Disease of rare occurrence

Amoebiasis

Table 7 shows the incidence of amoebiasis in 2014 was similar to the incidence of the illness in the 3-year average (2.2 cases per 100,000 persons compared to 2.6 cases per 100,000 persons). The Winnipeg Regional Health Authority (Winnipeg RHA) experienced the highest incidence of amoebiasis in 2014 with 3.1 cases per 100,000 persons (Figure 13). Statistics Eastern RHA and Northern RHA both had no confirmed cases of amoebiasis in 2014.

Table 7: Number of laboratory-confirmed amoebiasis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 3-year average (2012-2014)

	2014		2012-2014 Average	
	Case Count	Incidence	Case Count	Incidence
Total	22	2.2	21	2.6
Female	12	1.8	11	2.0
Male	10	2.4	10	2.5
	Age Analysis (in years)		Age Analysis (in years)	
Average	21.2		21.2	
Median	26.3		26.3	
Q1, Q3	16.0		17.7	
Min. Age	0.3		0.7	
Max. Age	87.1		87.3	

Table 8: Number of laboratory-confirmed amoebiasis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=20)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	0	0.0	0	0.0
1-4	0	0.0	0	0.0
5-9	0	0.0	1	2.6
10-14	1	2.6	1	2.6
15-19	2	7.1	0	0.0
20-24	2	6.2	0	0.0
25-29	1	2.2	0	0.0
30-34	2	2.3	7	6.2
35-39	2	3.1	5	3.6
Over 60	1	0.7	0	0.0



Figure 10: Number of laboratory confirmed anisakidosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2010 and 5 year averages (2005-2010)

Campylobacteriosis

In 2014, the incidence rate and case count of campylobacteriosis in Manitoba was lower than the 5-year average incidence rate and case count—a difference experienced by both females and males (Table 9). The female incidence rate in 2014 was 11.7 cases per 100,000 persons, compared to 17.4 cases per 100,000 persons in the 5-year average; the male incidence rate in 2014 was 14.3 cases per 100,000 persons, compared to 22.0 cases per 100,000 persons in the 5-year average. This is a difference of approximately six cases per 100,000 females and eight cases per 100,000 males.

Children ages 1-4 experienced the highest incidence rates in 2014. In this age group, females had 30.8 cases per 100,000 persons and males had 40.9 cases per 100,000 persons (Figure 11). With the exception of males less than one-year old (35.2 cases per 100,000 persons) and males ages 15-19 (22.3 cases per 100,000 persons) the rest of the age groups all had incidence rates less than 20 cases per 100,000 persons.

Table 9: Number of laboratory-confirmed campylobacteriosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	170	13.0	247	19.7
Female	77	11.7	110	17.4
Male	93	14.3	137	22.0
	Age Analysis (in years)		Age Analysis (in years)	
Average	32.6		35.7	
Median	28.2		32.3	
St. Dev.	23.9		34	
Min. Age	0.6		0.0	
Max. Age	89.2		95.1	

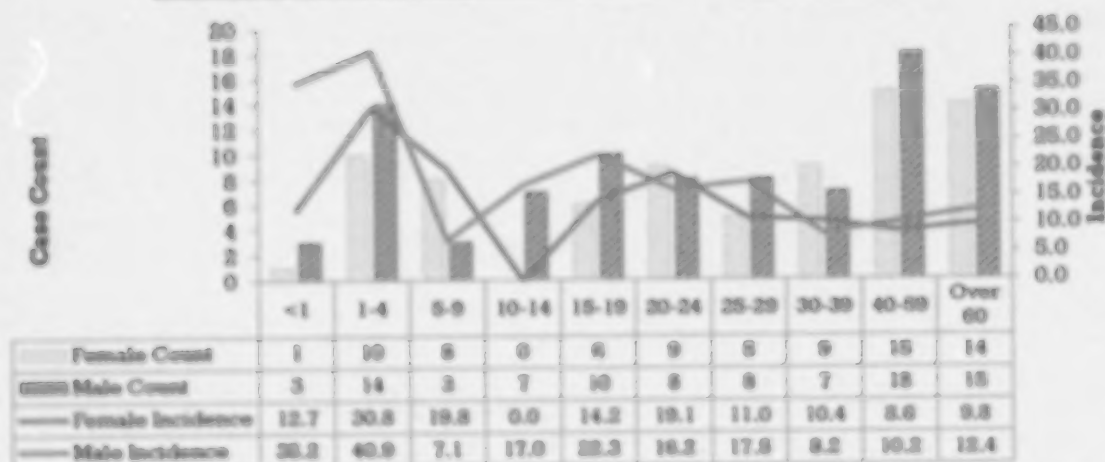


Figure 11: Number of laboratory-confirmed campylobacteriosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=170)

Figure 12 shows Southern Health-Santé Sud had the highest incidence rates of campylobacteriosis, both in 2014 and in the 5-year average (26.7 cases per 100,000 persons and 34.4 cases per 100,000 persons, respectively). Conversely, Winnipeg RHA had the lowest incidence rates of campylobacteriosis for both 2014 and the 5-year average (6.6 cases per 100,000 persons and 6.9 cases per 100,000 persons, respectively). Southern Health-Santé Sud and Prairie Mountain Health consistently had campylobacteriosis incidence rates above the provincial incidence rate from 2009 to 2014 (Figure 13). But, across all RHAs, the incidence of campylobacteriosis decreased from 2012 to 2014.

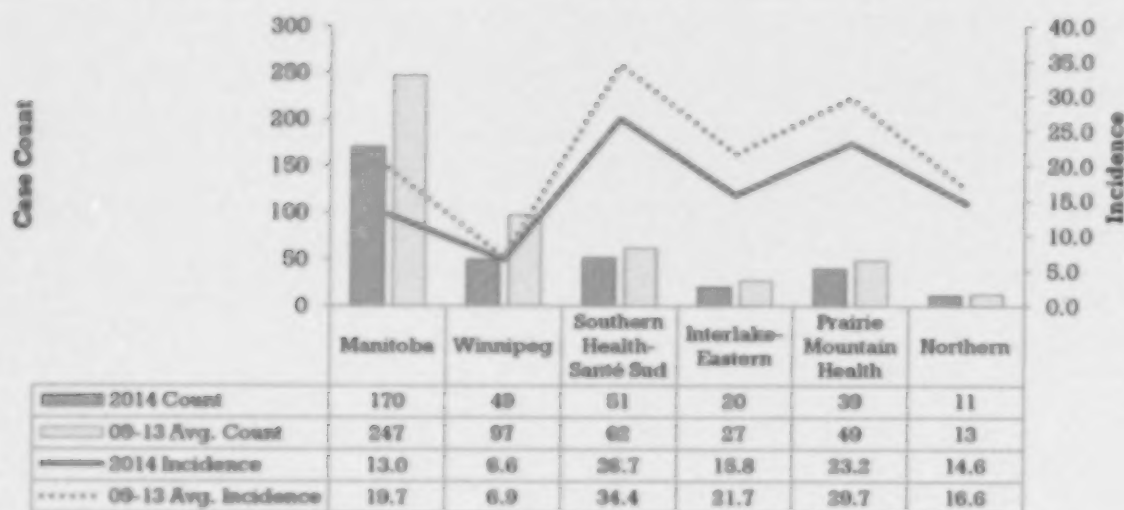


Figure 12: Number of laboratory-confirmed campylobacteriosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

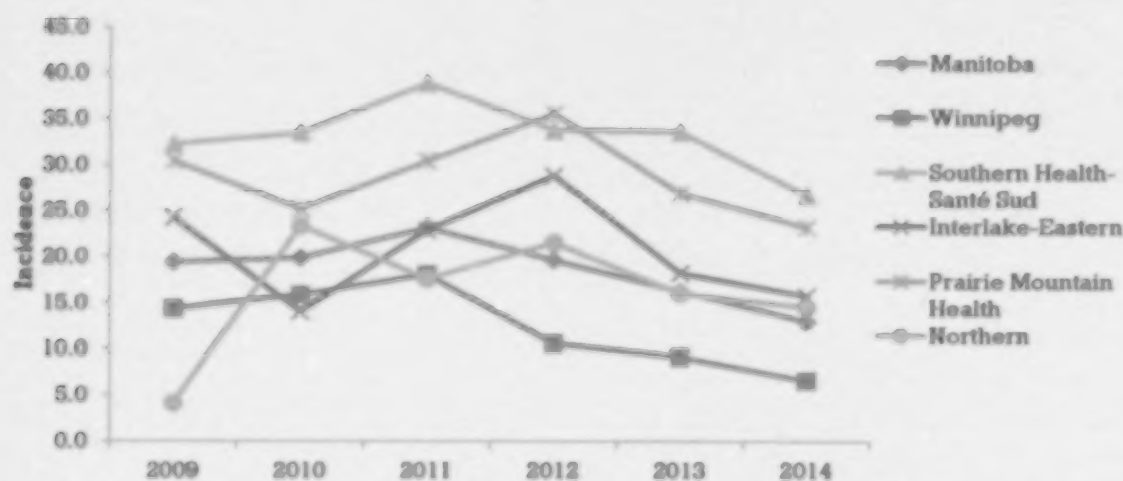


Figure 13: Campylobacteriosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Cryptosporidiosis

Higher than expected case counts of cryptosporidiosis were observed during a ten-week period in late summer/early Fall 2014. There were 86 laboratory-confirmed cases with specimens collected during this time (from August 1 to November 24, 2014) but, no common source or exposure was identified⁴. Expected levels of cryptosporidiosis were reported during the rest of 2014, bringing the total case count to 113. This increase in cases resulted in the 2014 incidence rate being approximately three-times greater than the 5-year average incidence rate (8.7 cases per 100,000 persons compared to 2.6 cases per 100,000 persons). With 38.0 cases per 100,000 persons, males ages 1-4 experienced the highest incidence rate of all the age groups, in 2014 (Figure 14). But, a comparison of the 2014 provincial incidence rates for females and males shows females had a slightly higher incidence than males, overall (9.3 cases per 100,000 persons, compared to 8.0 cases per 100,000 persons) (Table 10).

Table 10: Number of laboratory-confirmed cryptosporidiosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	113	8.7	33	2.6
Female	61	9.3	20	3.2
Male	52	8.0	13	2.0
	Age Analysis (in years)		Age Analysis (in years)	
Average	21.7		20.1	
Median	16.4		18.3	
St. Dev.	21.7		15.5	
Min. Age	0.7		1.2	
Max. Age	78.2		74.7	

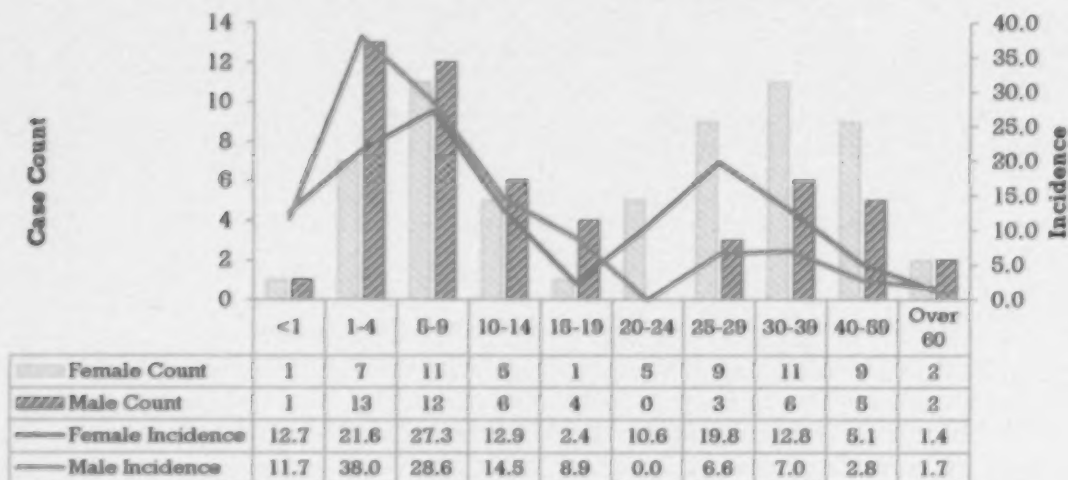


Figure 14: Number of laboratory-confirmed cryptosporidiosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=113)

⁴ Internal report

Northern RHA had the highest incidence rate in 2014 with 35.8 cases per 100,000 persons (Figure 15). Winnipeg RHA, despite having the most cases of all the RHAs in 2014 (40 cases), had the lowest incidence rate in 2014 with 5.4 cases per 100,000 persons (Figure 15). Figure 16 shows all RHAs experienced an increase in the incidence of cryptosporidiosis in 2014.

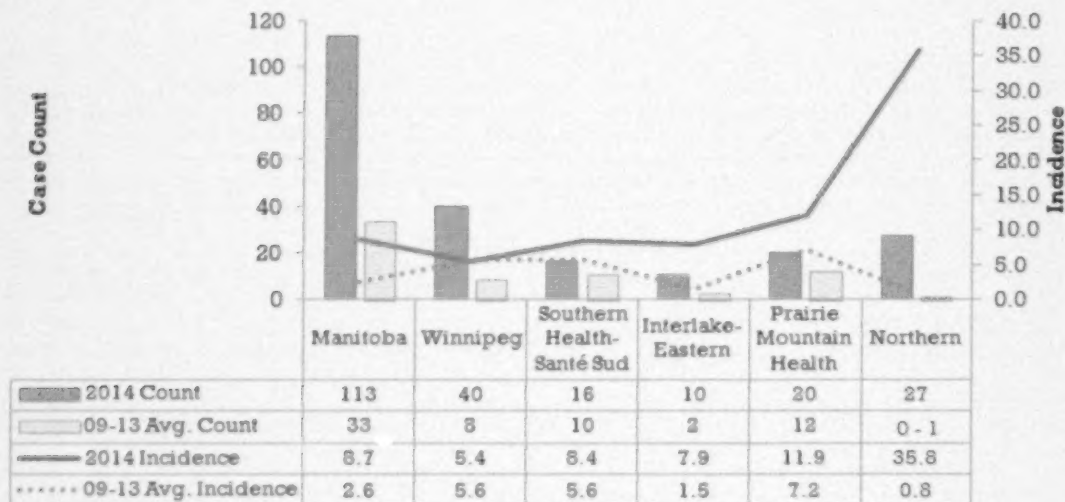


Figure 15: Number of laboratory-confirmed cryptosporidiosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

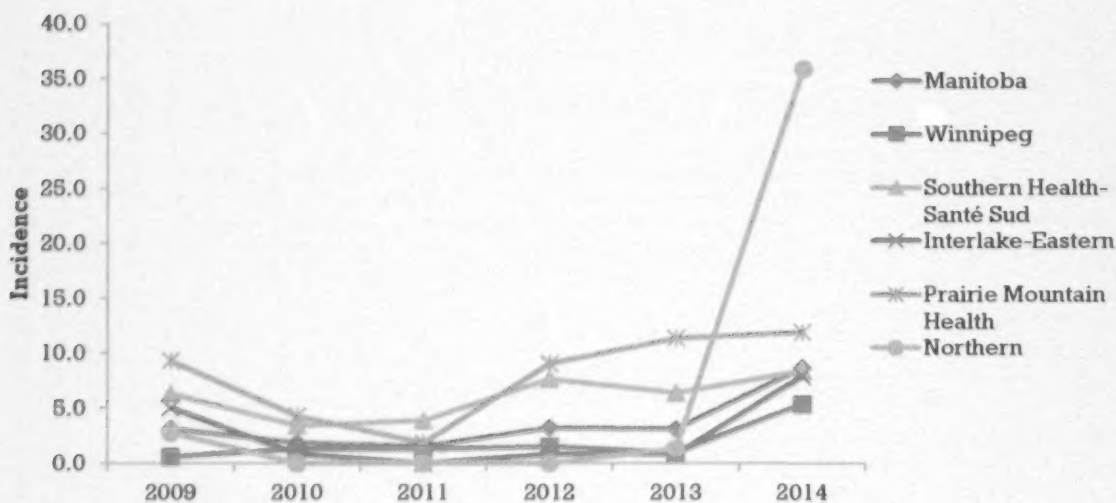


Figure 16: Cryptosporidiosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Giardiasis

Table 11 shows the incidence rate of giardiasis in 2014 (6.6 cases per 100,000 persons) was less than the incidence rate in the 5-year average (9.1 cases per 100,000 persons). Children ages 1-4 experienced the highest incidence rate (27.7 cases per 100,000 females and 46.8 cases per 100,000 males), in 2014 (Figure 17). There were no confirmed cases of giardiasis in children less than one-year old in 2014; the remaining age groups had incidence rates less than 10 cases per 100,000 persons.

Table 11: Number of laboratory-confirmed giardiasis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	86	6.6	115	9.1
Female	44	6.7	50	7.9
Male	42	6.5	65	10.4
	Age Analysis (in years)		Age Analysis (in years)	
Average	25.2		23.4	
Median	20.9		16.9	
St. Dev.	22.3		21.1	
Min. Age	1.1		0.0	
Max. Age	73.9		90.1	

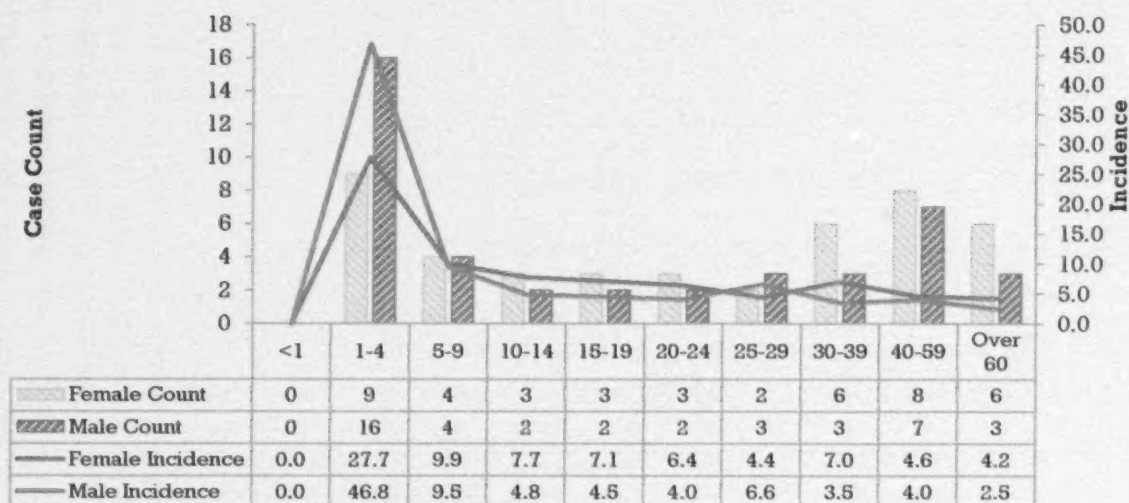


Figure 17: Number of laboratory-confirmed giardiasis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=86)

In both 2014 and the 5-year average, Southern Health-Santé Sud had the highest incidence of giardiasis, with 7.9 cases per 100,000 persons and 13.0 cases per 100,000 persons, respectively (Figure 18). Figure 19 shows the incidence rate for each RHA decreased from 2010 to 2014; the decrease was not steady, with some fluctuations in incidence over the six years. Figures 18 and 19 show Interlake-Eastern RHA consistently had the lowest incidence of the disease from 2009 to 2014.

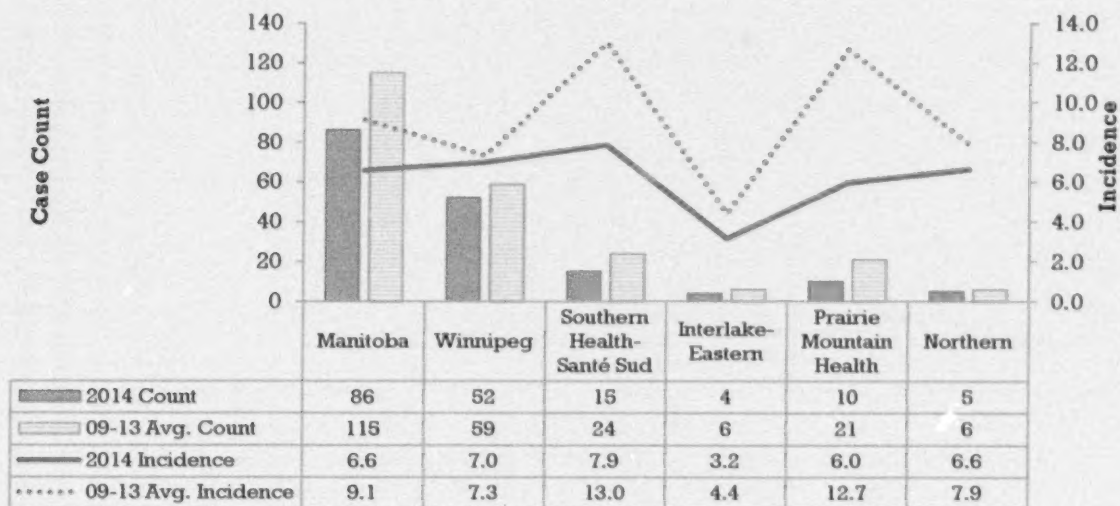


Figure 18: Number of laboratory-confirmed giardiasis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

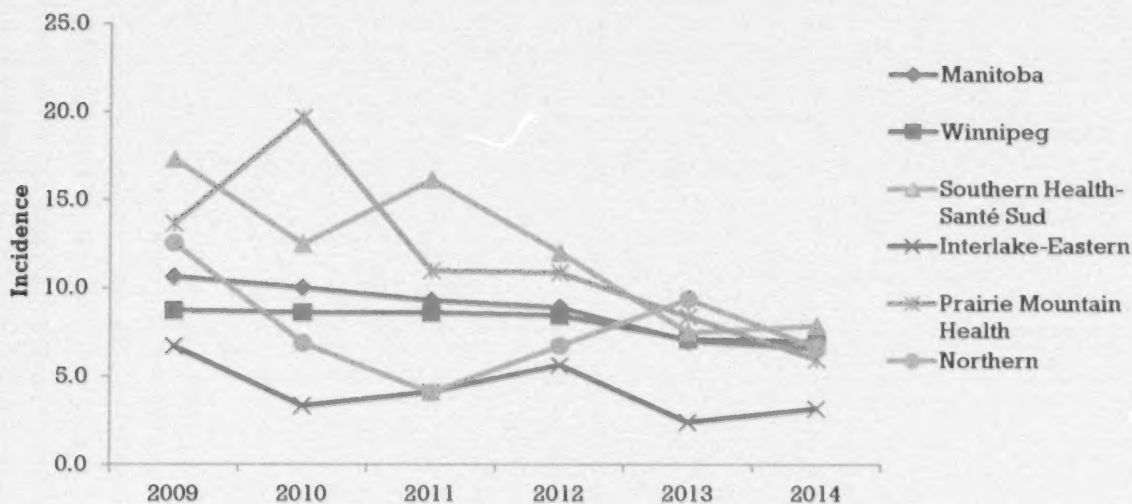


Figure 19: Giardiasis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Hepatitis A

In 2014, there were eight laboratory-confirmed hepatitis A cases in Manitoba which categorizes hepatitis A as a disease of rare occurrence (see Methods, page 12). Table 14 shows seven of the eight cases occurred in residents of Winnipeg RHA (one case occurred in a resident of Prairie Mountain Health). In Manitoba, cases of hepatitis A are often acquired outside of Canada; however the possibility of secondary transmission within the province does exist.

Table 12: Number of laboratory-confirmed hepatitis A cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	8	0.6	9	0.7
Female	3	0.5	4	0.6
Male	5	0.8	5	0.7
	Age Analysis (in years)		Age Analysis (in years)	
Average	36.3		32.6	
Median	33.7		24.0	
St. Dev.	23.2		24.7	
Min. Age	7.2		2.8	
Max. Age	69.7		93.9	

Table 13: Number of laboratory-confirmed hepatitis A cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=8)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	0	0.0	0	0.0
1-4	0	0.0	0	0.0
5-9	1	2.5	1	2.4
10-14	0	0.0	0	0.0
15-19	0	0.0	0	0.0
20-24	0	0.0	1	2.0
25-29	0	0.0	1	2.2
30-39	0	0.0	1	1.2
40-59	0	0.0	1	0.6
Over 60	2	1.4	0	0.0

Table 14: Number of laboratory-confirmed hepatitis A cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	8	0.6	9	0.7
Winnipeg	7	0.9	6	1.0
Southern Health-Santé Sud	0	0.0	0 – 1	0.4
Interlake-Eastern	0	0.0	0 – 1	0.5
Prairie Mountain Health	1	0.6	1	0.6
Northern	0	0.0	0 – 1	0.3

Salmonellosis

The incidence rate of salmonellosis in 2014 was very close to the incidence rate of salmonellosis in the 5-year average (17.5 cases per 100,000 persons compared to 17.1 cases per 100,000 persons) (Table 15). In 2014, more females than males were reported to have salmonellosis (20.8 cases per 100,000 persons and 14.2 cases per 100,000 persons, respectively), in Manitoba. This trend is not apparent in the 5-year average where both females and males were reported to have an average of 108 cases per year (different female and male population sizes account for the slight difference in incidence rates in the 5-year average).

There were more laboratory-confirmed cases in older adults than in children, but the 2014 incidence rate fluctuated over the age groups and between the sexes with no apparent trend (Figure 20). Salmonellosis had the highest 2014 incidence rate of all the enteric diseases included in this report.

Table 15: Number of laboratory-confirmed salmonellosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	229	17.5	215	17.1
Female	137	20.8	108	16.9
Male	92	14.2	108	17.3
	Age Analysis (in years)		Age Analysis (in years)	
Average	40.7		36.4	
Median	39.5		33.6	
St. Dev.	23.6		24.6	
Min. Age	0.6		0.0	
Max. Age	94.4		96.4	

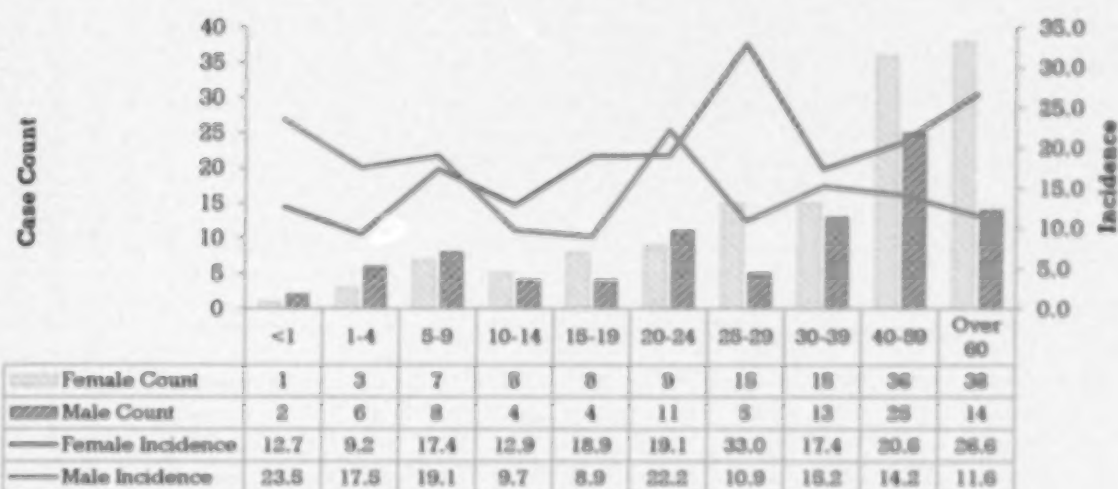
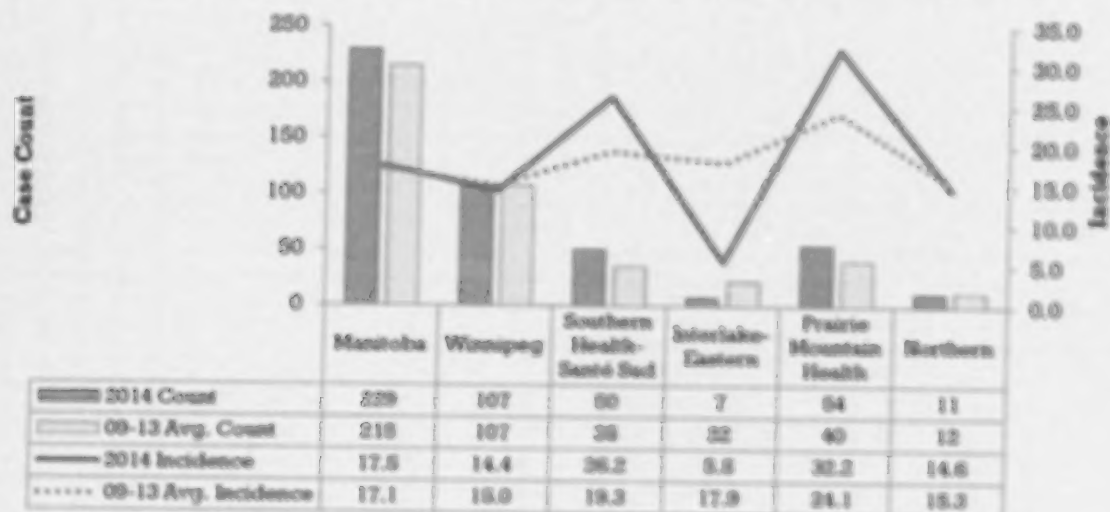


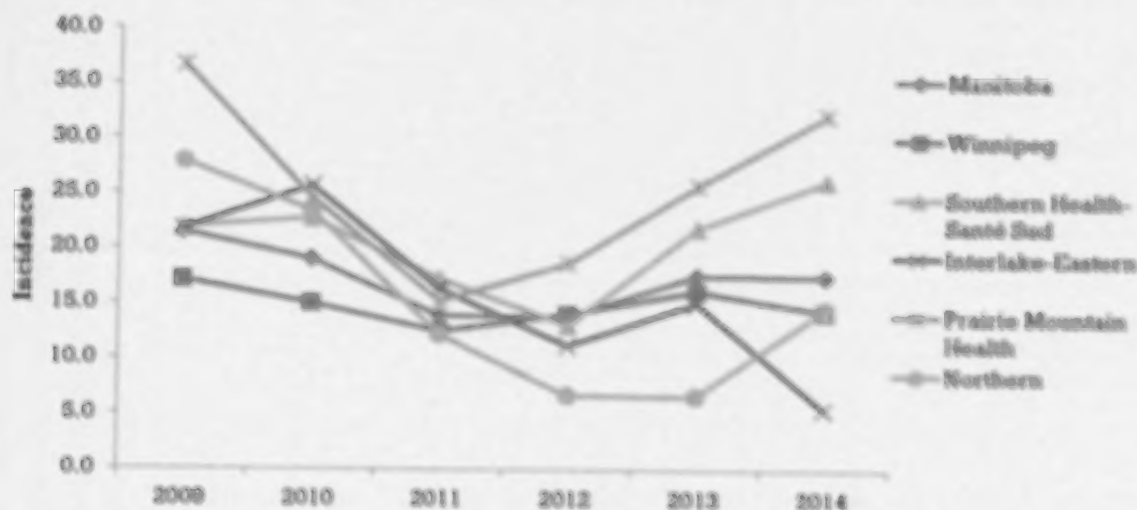
Figure 20: Number of laboratory-confirmed salmonellosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=229)

Figure 21 shows Prairie Mountain Health had the highest incidence rates of salmonellosis in both 2014 and the 5-year average (32.2 cases per 100,000 persons and 24.1 cases per 100,000 persons, respectively). Interlake-Eastern RHA experienced the lowest incidence rate in 2014 with 5.5 cases per 100,000 persons. Most RHAs experienced a decrease in incidence from 2010 to 2012, with an increase in incidence following 2012 (Figure 22).



*One case with unknown/missing regional health authority (RHA) in 2009-2013 average.

Figure 21: Number of laboratory-confirmed salmonellosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)



*One case with unknown/missing regional health authority (RHA) in 2010.

Figure 22: Salmonellosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Shigellosis

Table 16 shows the incidence rate of shigellosis in 2014 (2.7 cases per 100,000 persons) was similar to the incidence rate of shigellosis in the 5-year average (2.2 cases per 100,000 persons). In 2014, there were no laboratory-confirmed cases of shigellosis in children less than one-year old; children ages 1-4 had the highest incidence rates for both females and males (12.3 cases per 100,000 persons and 14.6 cases per 100,000 persons, respectively) (Figure 23). The high incidence rates in the 1-4 age group are due to the small population in this age group. For example, persons ages 40-59 had similar laboratory-confirmed case counts (4 case for females and 4 cases for males) but the female and male incidence rates in the 40-59 age group were both 2.3 cases per 100,000 persons—lower than the incidence rates of the 1-4 age group, despite similar case counts.

Table 16: Number of laboratory-confirmed shigellosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	36	2.7	41	2.2
Female	16	2.4	21	2.2
Male	19	2.9	21	2.3
	Age Analysis (in years)		Age Analysis (in years)	
Average	20.6		23.4	
Median	21.1		14.2	
St. Dev.	23.1		21.1	
Min. Age	1.9		0.0	
Max. Age	75.6		75.1	



Figure 23: Number of laboratory-confirmed shigellosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=30)

Most regions had incidence rates below the provincial incidence rate, in 2014, with the exception of Southern Health-Santa Sud and Northern RHA, which had higher incidence rates (Figure 24). Figure 25 reveals Northern RHA had very unstable chigalliosis incidence rates from 2009 to 2013, but the rate stayed fairly constant between 2013 and 2014. Northern RHA consistently had a higher incidence rate than the other RHAs from 2009-2014. Overall, Northern RHA's incidence rates are strongly influenced by the small population size of the region; a small change in the number of confirmed cases can create a large change in incidence. This could explain the large fluctuations in incidence from 2009-2013.

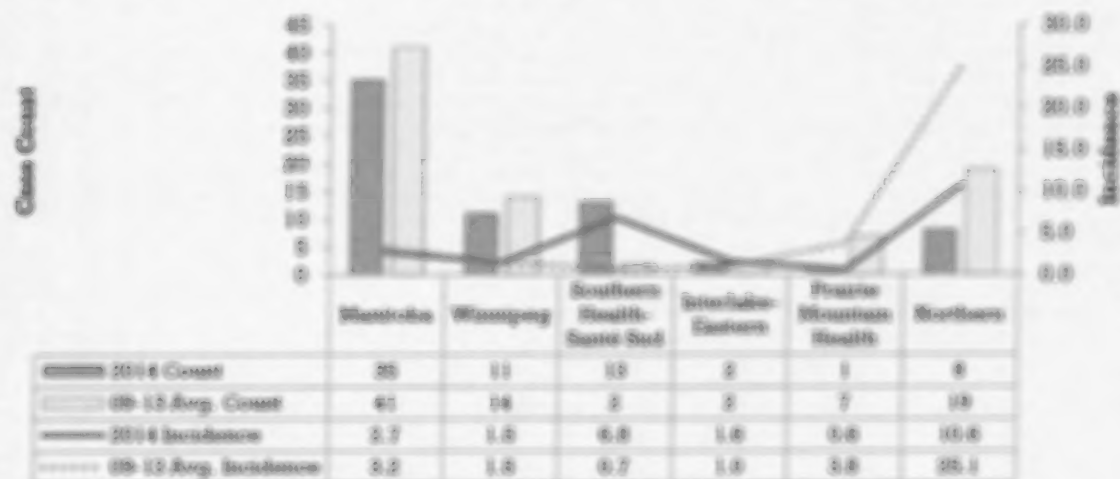


Figure 24: Number of laboratory-confirmed chigalliosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

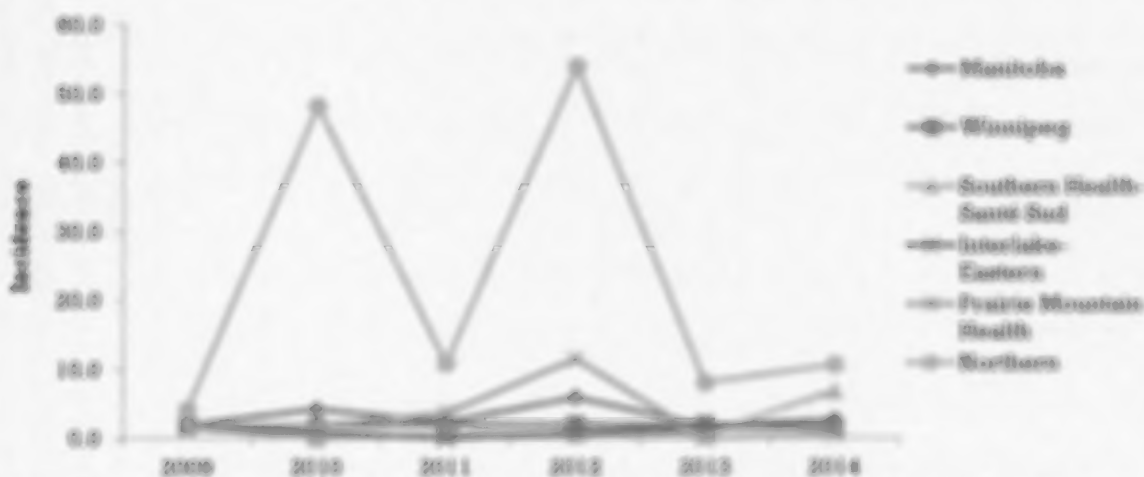


Figure 25: Chigalliosis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Verotoxigenic *Escherichia coli* (VTEC)

In 2014, the incidence rate of VTEC was slightly lower than the incidence rate of the illness in the 5-year average (5.7 cases per 100,000 persons compared to 5.8 cases per 100,000 persons) (Table 17). Figure 28 shows males ages 1-4 had the highest incidence rate with 17.5 cases per 100,000 persons, in 2014. For females, the highest incidence rate occurred in those less than one-year old (12.7 cases per 100,000 persons), in 2014. Only one case of VTEC occurred in this age group (females less than one-year old), but the small size of the specified age-gender population contributed to the rate appearing conspicuously large.

Table 17: Number of laboratory-confirmed verotoxigenic *Escherichia coli* (VTEC) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Montana, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	44	5.7	43	5.8
Females	13	5.3	38	6.1
Males	31	5.1	5	5.4
	Age Analysis (in years)		Age Analysis (in years)	
Average	11.8		10.2	
Median	17.3		15.0	
St. Dev.	14.2		15.0	
Min. Age	0.0		0.0	
Max. Age	47.0		47.0	

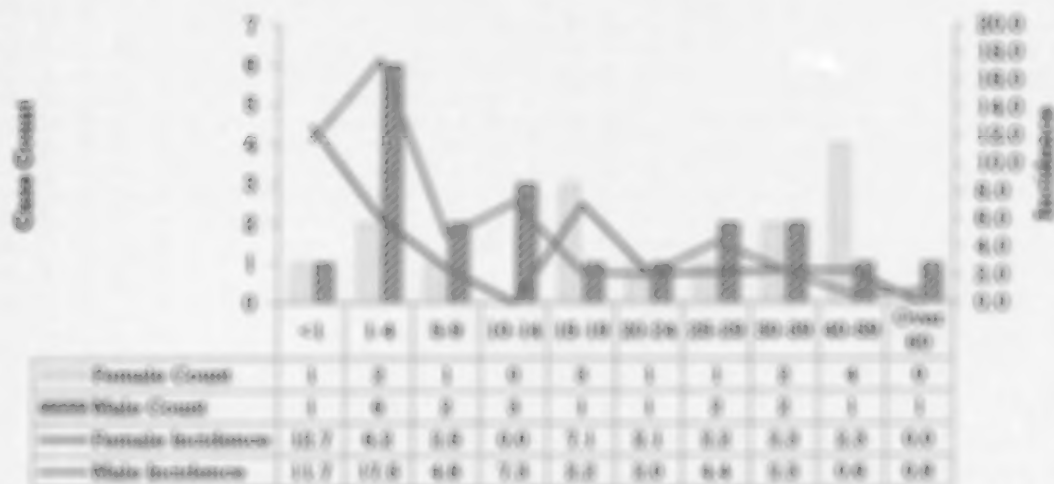


Figure 28: Number of laboratory-confirmed verotoxigenic *Escherichia coli* (VTEC) cases and incidence rates (per 100,000 persons) by age group and sex in Montana, 2014. (0-49)

Southern Health-Santa Sul and Interstate Eastern HHS both had the highest incidence of VTEC in 2013 with 6.7 cases per 100,000 persons. Southern Health-Santa Sul also had the highest incidence in the 5-year average (7.5 cases per 100,000 persons) (Figure 25). Figure 26 shows Southern Health-Santa Sul had the highest incidence of VTEC, among all HHSs, from 2009 to 2013, only dipping below Prairie Mountain Health's incidence rate in 2013.

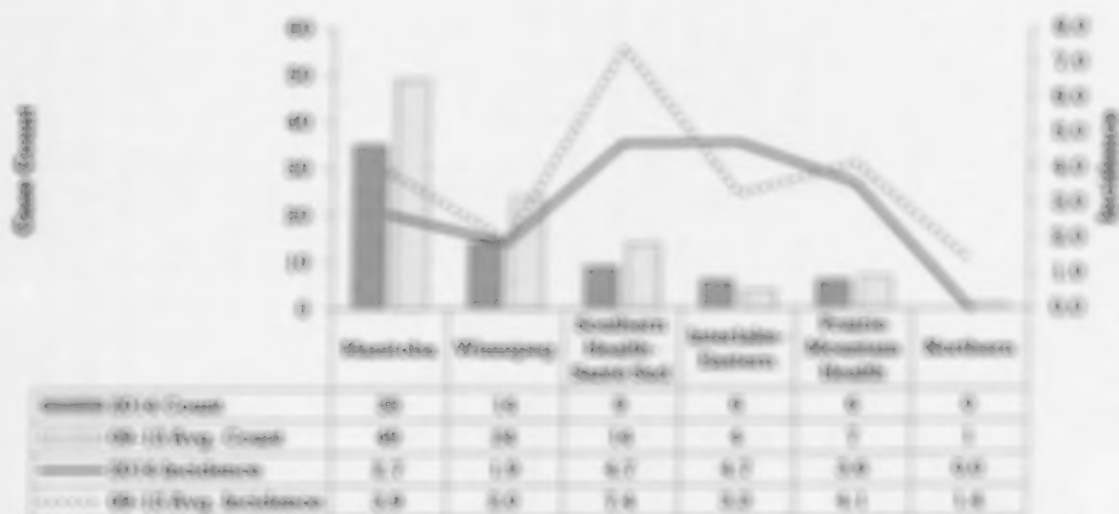


Figure 25: Number of laboratory confirmed verotoxigenic *Escherichia coli* (VTEC) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2013 and 5-year average (2009-2013)

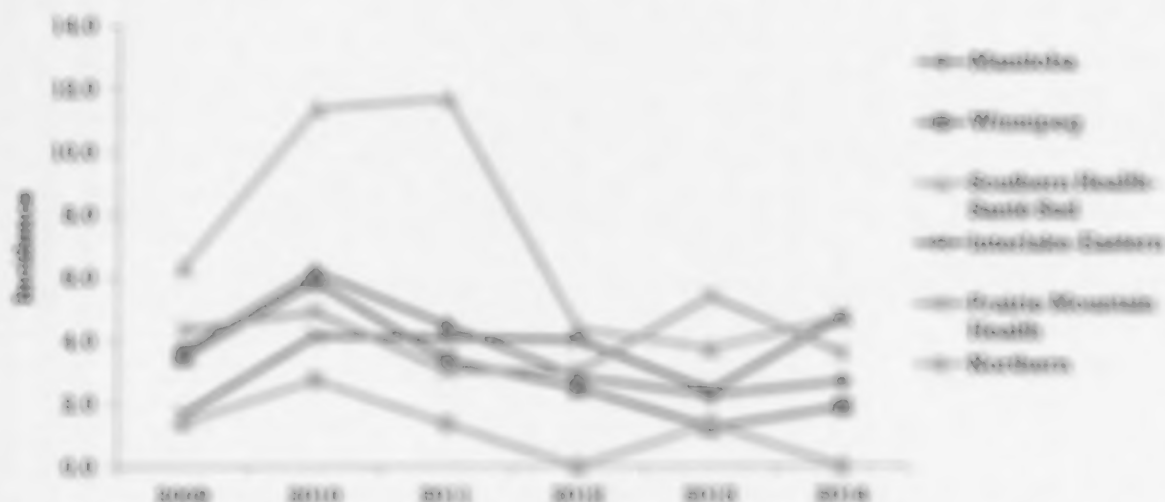


Figure 26: Verotoxigenic *Escherichia coli* (VTEC) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2013

Vaccine Preventable Diseases

Vaccine preventable diseases (VPDs) are those communicable diseases that are preventable through immunization. Table 18 shows there were six VPDs reported to MHHLS in 2014: invasive *Haemophilus influenzae* disease (IND), invasive meningococcal disease (IMD), invasive pneumococcal disease (IPD), measles, pertussis, and typhoid. Of the VPDs included in this report, IPD account for the largest proportion of cases ($n=135$, 10.3 cases per 100,000 population).

Table 18: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each vaccine preventable disease (VPD) confirmed in Manitoba, 2009-2014

Disease Name	2009		2010		2011		2012		2013		2014	
	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence
Diphtheria*	1	0.1	1	0.1	1	0.1	0	0.0	0	0.0	0	0.0
Invasive <i>Haemophilus influenzae</i> Disease (IND)*	0	0.7	12	1.0	14	1.1	14	1.1	14	1.1	10	0.8
Invasive Meningococcal Disease (IMD)*	0	0.5	10	0.8	2	0.2	2	0.2	9	0.7	3	0.2
Invasive Pneumococcal Disease (IPD)	130	11.2	175	14.2	130	10.4	153	12.0	132	10.2	135	10.3
Measles*	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	9	0.7
Mumps*	4	0.3	2	0.2	7	0.6	6	0.5	1	0.1	0	0.0
Pertussis*	29	2.4	53	4.3	30	2.4	119	9.4	7	0.5	13	1.0
Rubella, confirmed*	2	0.2	2	0.2	0	0.0	1	0.1	0	0.0	0	0.0
Rubella, congenital*	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0
Typhoid*	6	0.5	6	0.5	8	0.6	6	0.5	2	0.2	1	0.1

* Disease with a cell count ≤ 5 in 2014; will not have a detailed analysis performed

* Disease of rare occurrence

Note:

MHHLS produces an annual immunization report which provides information on childhood vaccines (those received between ages 1 and 17). As of 2014, it will also include information on adult vaccinations. The immunization reports can be found on the Epidemiology and Surveillance website:

<http://www.gov.mb.ca/health/publichealth/surveillance/mima/index.html>

Invasive *Haemophilus influenzae* Disease (IHD)

In 2014, there were 10 laboratory-confirmed IHD cases in Manitoba categorizing IHD as a disease of rare occurrence (see Methods, page 12):

- three cases were **type b** strains, and
- seven cases were **non-type b** strains.

Only *Haemophilus influenzae* type b (Hib) is vaccine preventable, but *all* types have been included under this disease name, in the VPDs category. Prior to the implementation of the Hib vaccine, the type b strain of IHD was the *most common* strain of IHD to contract⁵.

Table 19 shows, in 2014, more cases were laboratory-confirmed in males than in females (1.1 cases per 100,000 persons compared to 0.5 cases per 100,000 persons). The average age of disease onset in 2014 was 20.4 years, and 28.7 years for the 5-year average. The median age of onset in 2014 and the 5-year average was also very close (1.6 years and 4.3 years, respectively). The large differences between the average age and the median age indicate the disease was acquired mainly by young children, and some older adults. Table 20 reflects this idea, as seven cases occurred in children less than five years of age; the remaining three cases occurred in adults over the age of 40. Northern RHA had the highest incidence in 2014 and the 5-year average with approximately 4.0 cases per 100,000 persons (Table 21).

Table 19: Number of laboratory-confirmed invasive *Haemophilus influenzae* disease cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	10	0.8	13	1.0
Female	3	0.5	6	0.9
Male	7	1.1	7	1.1
	Age Analysis (in years)		Age Analysis (in years)	
Average	20.4		28.7	
Median	1.6		4.3	
St. Dev.	21.5		31.7	
Min. Age	0.2		0.1	
Max. Age	79.5		83.6	

⁵ Manitoba Health, Healthy Living and Seniors. Communicable Disease Management Protocol: Invasive *Haemophilus influenzae* Disease (IHD). Accessed: September, 2015.
<http://www.gov.mb.ca/health/publichealth/cdc/protocol/ihd.pdf>.

Table 20: Number of laboratory-confirmed invasive *Haemophilus influenzae* disease cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=10)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	1	12.7	3	35.2
1-4	0	0.0	3	8.8
5-9	0	0.0	0	0.0
10-14	0	0.0	0	0.0
15-19	0	0.0	0	0.0
20-24	0	0.0	0	0.0
25-29	0	0.0	0	0.0
30-39	0	0.0	0	0.0
40-59	1	0.6	0	0.0
Over 60	1	0.7	1	0.8

Table 21: Number of laboratory-confirmed invasive *Haemophilus influenzae* disease cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	10	0.9	13	1.0
Winnipeg	4	0.7	5	0.7
Southern Health-Santé Sud	0	0.5	2	0.7
Interlake-Eastern	0	0.0	2	1.0
Prairie Mountain Health	3	1.8	2	1.0
Northern	3	4.0	4	4.9

Invasive Pneumococcal Disease (IPD)

In 2014, IPD was the most reported VPD in Manitoba, with 135 laboratory-confirmed cases. Table 22 shows the incidence rate of IPD in 2014 (10.3 cases per 100,000 persons) was slightly lower than the incidence rate of IPD in the 5-year average (11.6 cases per 100,000 persons) (Table 22). The highest incidence rates of IPD occurred in children less than five years of age, and adults over 40 years of age. These two age groups are least likely to be fully-vaccinated against IPD because they were either a) too young to yet be eligible for the vaccine, or to have fully completed all of the recommended doses, or b) they missed the implementation of the primary vaccine program, and did not receive a vaccination against IPD as an adult.

Table 22: Number of laboratory-confirmed invasive pneumococcal disease (IPD) cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	138	10.3	146	11.6
Female	63	9.6	70	10.9
Male	72	11.1	76	12.3
	Age Analysis (in years)		Age Analysis (in years)	
Average	51.2		47.4	
Median	53.9		51	
St. Dev.	24.6		26.3	
Min. Age	0		0	
Max. Age	92.4		100.2	

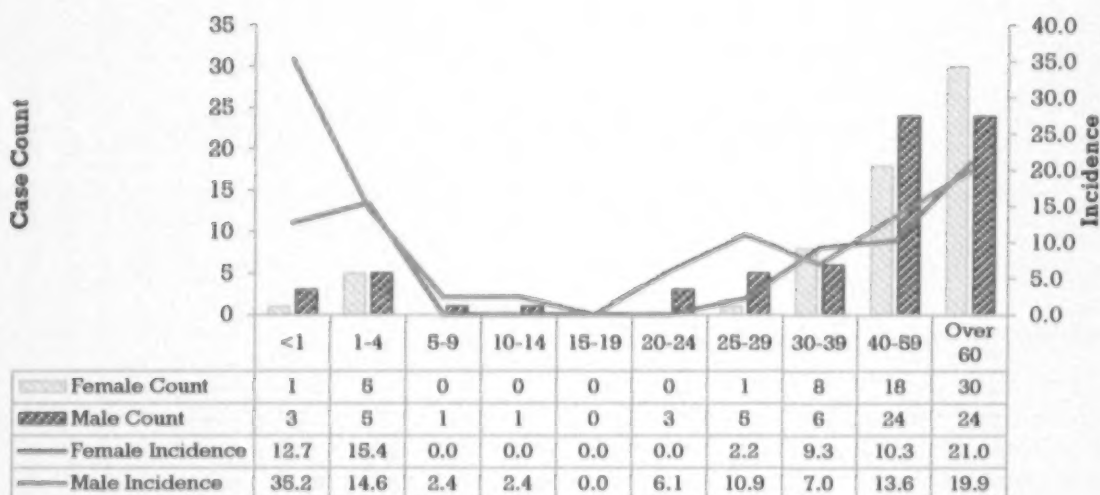


Figure 29: Number of laboratory-confirmed invasive pneumococcal disease (IPD) cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=135)

The incidence rates for IPD were highest in Northern RHA for both 2014 (18.6 cases per 100,000 persons) and the 5-year average (41.1 cases per 100,000 persons) (Figure 30). Incidence rates in Northern RHA were consistently higher than the incidence rates experienced by the other RHAs between 2009 and 2014. However, the incidence rate for Northern RHA decreased by about 20 cases per 100,000 persons between 2012 and 2014 while the other four RHA's incidence rates remained fairly constant over the six years (Figure 31).

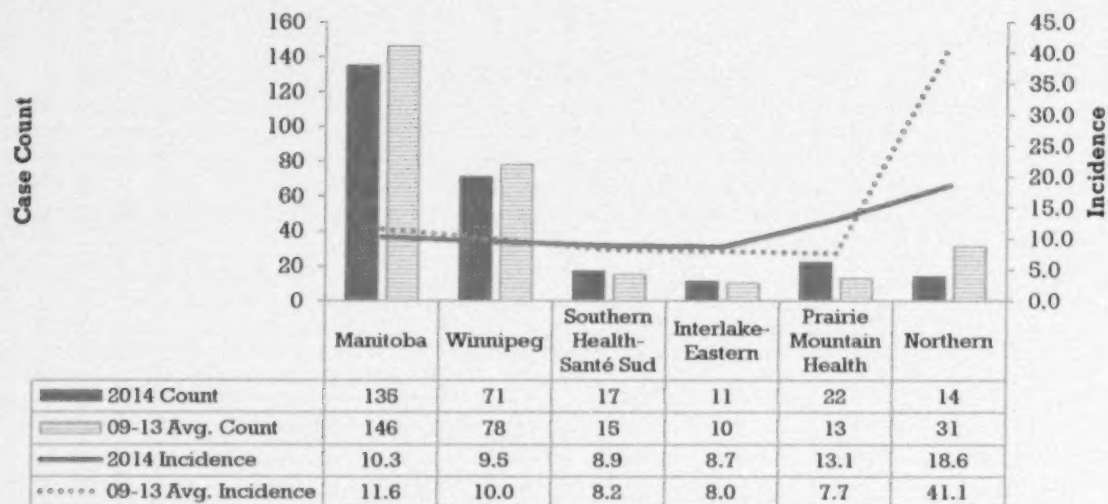


Figure 30: Number of laboratory-confirmed invasive pneumococcal disease (IPD) cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

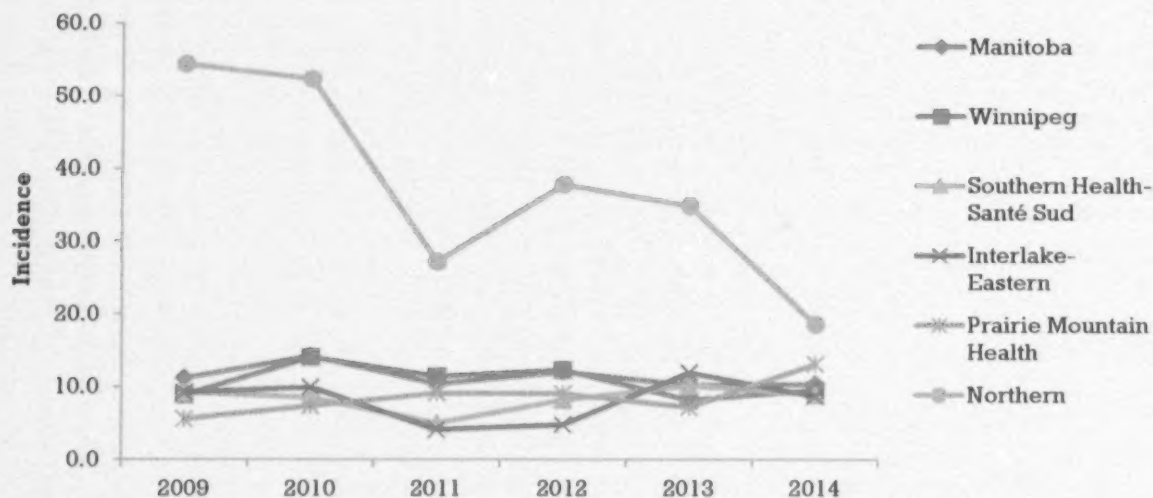


Figure 31: Invasive pneumococcal disease (IPD) incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Measles

In 2014, there were nine laboratory-confirmed measles cases in Manitoba, categorizing measles as a disease of rare occurrence (see Methods, page 12). Between 2009 and 2013 there was only one laboratory-confirmed case of measles in Manitoba, in the year 2010. The relatively-high case count in 2014 was due to an outbreak which occurred in the spring of that year.

Eight of the nine laboratory-confirmed cases in 2014 occurred between the beginning of March and the end of April—these eight cases made up the outbreak. The ninth case was reported in August⁶; this case was imported. That is, it originated outside of Canada, and was not related to the original outbreak. Prior to the 2014 outbreak, the last measles outbreak in Manitoba (consisting of 8 cases) occurred in 1992.

Table 23 shows the majority of the cases occurred in males (seven of nine total cases). Winnipeg RHA and Interlake-Eastern RHA experienced the highest incidence rates in 2014 – both had 0.8 cases per 100,000 persons (which corresponds to eight cases of measles in Winnipeg RHA and one case of measles in Interlake-Eastern RHA) (Table 24). Prairie Mountain Health and Northern RHA had no laboratory-confirmed cases of measles in 2014. Despite measles being a “childhood” disease, the majority of cases (six of nine) occurred in adults over the age of 19. One case occurred in a teen between the ages of 15 and 19, and one case occurred in a child between the ages of 1 and 4 (this was the case which occurred in August).

Table 23: Number of laboratory-confirmed measles cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	9	0.7	0 – 1	0.0
Female	2	0.3	0	0.0
Male	7	1.1	0 – 1	0.0
	Age Analysis (in years)		Age Analysis (in years)	
Average	28.2		1.0	
Median	29.4		1.0	
St. Dev.	15.3		0.0	
Min. Age	1.7		1.0	
Max. Age	49.7		1.0	

⁶ Internal Report

Table 24: Number of laboratory-confirmed measles cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=9)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	0	0.0	0	0.0
1-4	0	0.0	1	2.9
5-9	0	0.0	0	0.0
10-14	0	0.0	0	0.0
15-19	0	0.0	2	4.5
20-24	0	0.0	1	2.0
25-29	0	0.0	1	2.2
30-39	1	1.2	0	0.0
40-59	1	0.6	2	1.1
Over 60	0	0.0	0	0.0

Table 25: Number of laboratory-confirmed measles cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	9	0.7	0 - 1	0.0
Winnipeg	6	0.8	0 - 1	0.8
Southern Health-Santé Sud	2	1.0	0	0.0
Interlake-Eastern	1	0.8	0	0.0
Prairie Mountain Health	0	0.0	0	0.0
Northern	0	0.0	0	0.0

Pertussis

In 2014, there were seven cases of pertussis (also known as "whooping cough") in Manitoba, categorizing pertussis as a disease of rare occurrence (see Methods, page 12). Table 26 shows the 2014 incidence rate and case count were lower than the 5-year average incidence rate and case count—a difference experienced by both females and males. The female incidence rate in 2014 was 1.1 cases per 100,000 persons, compared to 3.9 cases per 100,000 persons in the 5-year average; the male incidence rate in 2014 was 0.9 cases per 100,000 persons, compared to 3.8 cases per 100,000 persons in the 5-year average. This is a difference of approximately three cases per 100,000 persons for females and males.

The average age, and the median age, of disease onset were low in both 2014 and the 5-year average. This suggests the majority of cases were laboratory-confirmed in younger people. This is confirmed by Table 27—nine cases occurred in people below the age of 10 while only four cases occurred in people between the ages of 10 and 39. In 2014, as in the 5-year average, it appears females and males carried an equal burden of the disease. Prairie Mountain Health and Northern RHA had no laboratory-confirmed cases of pertussis in 2014.

Table 26: Number of laboratory-confirmed pertussis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	13	1.0	48	3.8
Female	7	1.1	25	3.9
Male	6	0.9	24	3.8
	Age Analysis (in years)		Age Analysis (in years)	
Average	10.4		8.8	
Median	4.3		1.6	
St. Dev.	12.3		15.5	
Min. Age	0.3		0.0	
Max. Age	32.7		91.9	

Table 27: Number of laboratory-confirmed pertussis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=13)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	2	25.3	1	11.7
1-4	0	0.0	4	11.7
5-9	1	2.5	1	2.4
10-14	0	0.0	0	0.0
15-19	1	2.4	0	0.0
20-24	0	0.0	0	0.0
25-29	1	2.2	0	0.0
30-39	2	2.3	0	0.0
40-59	0	0.0	0	0.0
Over 60	0	0.0	0	0.0

Table 28: Number of laboratory-confirmed pertussis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	13	1.0	48	3.8
Winnipeg	5	0.7	11	0.7
Southern Health-Santé Sud	6	3.1	15	8.2
Interlake-Eastern	2	1.0	3	2.1
Prairie Mountain Health	0	0.0	6	3.3
Northern	0	0.0	15	19.6

Zoonotic and Environmental Diseases

For the purposes of this report, zoonotic and environmental diseases are those communicable diseases which are, or are capable of being, transmitted to humans through animals, or from some aspect of the environment. Table 29 shows there were 10 zoonotic and/ or environmental diseases reported to MHHLS in 2014.

Table 29: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each zoonotic disease and environmental disease confirmed in Manitoba, 2009-2014

Disease Name	2009		2010		2011		2012		2013		2014	
	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence
Blastomycosis ^a	9	0.7	6	0.5	9	0.7	14	1.1	19	1.5	15	1.1
Brucellosis ^a	1	0.1	1	0.1	3	0.2	1	0.1	2	0.2	1	0.1
Dengue ^a	0	0.0	0	0.0	3	0.2	4	0.3	12	0.9	2	0.2
<i>Dipyllobothrium latum</i> ^a	5	0.4	10	0.8	9	0.7	4	0.3	13	1.0	4	0.3
Hantavirus ^a	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0
Legionellosis ^a	0	0.0	5	0.4	5	0.4	3	0.2	4	0.3	2	0.2
Lyme	1	0.1	7	0.6	7	0.6	7	0.6	17	1.3	21	1.6
Malaria	14	1.2	14	1.1	26	2.1	18	1.4	15	1.2	20	1.5
Q. Fever ^a	2	0.2	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0
Rickettsial Disease, Other ^a	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	0	0.0
Strongyloidiasis	11	0.9	15	1.2	44	3.5	19	1.5	25	1.9	22	1.7
Toxoplasmosis ^a	1	0.1	4	0.3	5	0.4	3	0.2	0	0.0	0	0.0
Trichinosis ^a	0	0.0	2	0.2	0	0.0	2	0.2	0	0.0	0	0.0
Trypanosomiasis ^a	0	0.0	3	0.2	7	0.6	4	0.3	3	0.2	2	0.2
Tularemia ^a	1	0.1	1	0.1	1	0.1	0	0.0	4	0.3	2	0.2

^a Disease with a case count ≤ 5 in 2014; will not have a detailed analysis performed

^b Disease of rare occurrence

Blastomycosis

In 2014, there were 15 laboratory-confirmed cases of blastomycosis in Manitoba, categorizing blastomycosis as a disease of rare occurrence (see Methods, page 12). Blastomycosis had similar incidence rates in 2014 and the 5-year average; in both periods, the illness affected over twice as many males as it did females (Table 30). Despite this, Table 31 indicates females ages 10-14 had the highest incidence with 5.1 cases per 100,000 persons, but males ages 5-9 were not far behind with 4.8 cases per 100,000 persons; there were two laboratory-confirmed cases in both of these age groups. Table 32 shows Winnipeg RHA had the highest incidence rate in 2014 (1.7 cases per 100,000 persons) while Interlake-Eastern RHA, Prairie Mountain Health, and Northern RHA experienced no laboratory-confirmed cases of blastomycosis in 2014.

Table 30: Number of laboratory-confirmed blastomycosis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	15	1.1	12	0.9
Female	4	0.6	4	0.6
Male	11	1.7	8	1.2
	Age Analysis (in years)		Age Analysis (in years)	
Average	29.9		42.4	
Median	22.5		40.0	
St. Dev.	19.6		23.4	
Min. Age	6.3		2.8	
Max. Age	61.6		88.2	

Table 31: Number of laboratory-confirmed blastomycosis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=15)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	0	0.0	0	0.0
1-4	0	0.0	0	0.0
5-9	0	0.0	2	4.8
10-14	2	5.1	1	2.4
15-19	1	2.4	0	0.0
20-24	1	2.1	1	2.0
25-29	0	0.0	0	0.0
30-39	0	0.0	2	2.3
40-59	0	0.0	4	2.3
Over 60	0	0.0	1	0.8

Table 35: Number of laboratory-confirmed histoplasmosis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	15	1.1	12	0.9
Winnipeg	13	1.7	11	1.8
Southern Health-South End	2	1.0	2	0.8
Interlake-Eastern	0	0.0	0 - 1	0.3
Prairie Mountain Health	0	0.0	0 - 1	0.1
Northern	0	0.0	0 - 1	0.3

Lyme Disease

Table 33 shows the incidence rate of Lyme disease in 2014 was almost 3 times greater than the incidence rate of Lyme disease in the 5-year average (1.8 cases per 100,000 persons compared to 0.6 cases per 100,000 persons). In 2014, Lyme disease was only acquired by people between the ages of four and 75 (Table 33). The highest incidence rate belonged to males in the 15-19 year old age group with 6.5 cases per 100,000 persons (Table 34).

Note: Lyme disease case counts are also reported on the [MMDL's](http://www.gov.mb.ca/health/lyme/index.html), Environmental Health website⁷. Any discrepancies between this report and the website can be attributed to different reporting processes used by Environmental Health and Public Health, such as: using different databases, having different dates of data extraction, and using different date extraction criteria.

Table 33: Number of laboratory-confirmed Lyme disease cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	21	1.8	8	0.6
Female	5	0.5	4	0.5
Male	16	2.3	4	0.7
	Age Analysis (in years)		Age Analysis (in years)	
Average	37.5		42.7	
Median	37.7		46.1	
Q1, Q3	26.3		54.8	
Min. Age	5.0		5.2	
Max. Age	74.5		81.4	

Table 34: Number of laboratory-confirmed Lyme disease cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=21)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<5	0	0.0	0	0.0
5-9	1	5.1	1	5.0
10-14	0	0.0	0	0.0
15-19	1	2.6	1	2.6
20-24	0	0.0	2	6.5
25-29	0	0.0	1	3.3
30-34	1	1.2	0	0.0
35-39	0	0.0	4	11.3
40-44	1	0.7	0	0.0

⁷ <http://www.gov.mb.ca/health/lyme/index.html>

Southern Health-Santa Sud had the highest incidence of Lyme disease in both 2013 and in the 3-year average. Southern Health-Santa Sud's incidence rate in 2013 was over twice the 3-year average incidence rate (8.8 cases per 100,000 persons compared to 4.3 cases per 100,000 persons) (Figure 38). Figure 38 shows Southern Health-Santa Sud carried the largest burden of Lyme disease, compared to the other RHA's. Southern Health-Santa Sud's incidence rate increased by about 8 cases per 100,000 persons between 2008 and 2013, but held constant from 2013 to 2014. The other RHA's incidence rates remained fairly constant over all six years. Northern RHA had no cases of Lyme disease within the six years from 2008 to 2014. These trends are not surprising as between 1995 and 2013 there were no established black-legged tick populations found in Northern RHA, with the majority of established populations being found in Southern Health-Santa Sud¹.

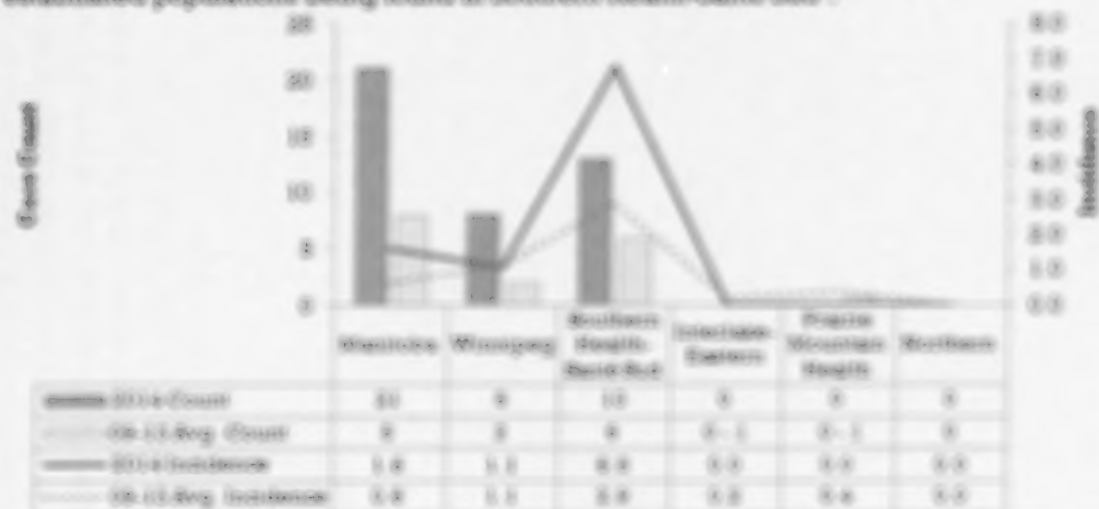


Figure 38: Number of laboratory confirmed Lyme disease cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2013 and 3-year averages (2008-2013)

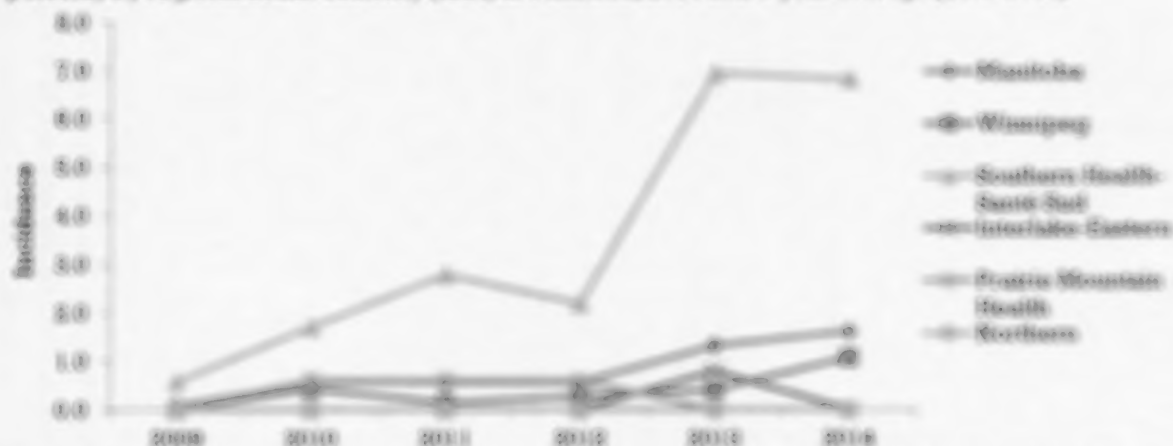


Figure 39: Lyme disease incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2008-2014

¹ Manitoba Health, Healthy Living and Senior, Lyme Disease Risk Assessment and the Integrated Tick Surveillance in Manitoba. Accessed July 28, 2015. <http://www.gov.mb.ca/health/lyme/assessment.html>

Malaria

The incidence rate of malaria in 2014 is similar to the incidence rate of malaria in the 5-year average (1.5 cases per 100,000 persons compared to 1.4 cases per 100,000 persons). Males made up 16 in 20 (80.0%) of the laboratory-confirmed malaria cases in 2014 (Table 35). In Manitoba, in 2014, males had 2.5 cases per 100,000 persons and females had 0.6 cases per 100,000 persons. Males ages 20-24 had the highest incidence of malaria with 10.1 cases per 100,000 persons (Table 36). In 2014, Winnipeg RHA had the highest incidence of malaria with 2.3 cases per 100,000 persons; Interlake-Eastern RHA was the only RHA to have no laboratory-confirmed cases of malaria in 2014. The other three RHAs displayed low incidence rates for this disease (Table 37). Malaria is considered a travel acquired disease.

Table 35: Number of laboratory-confirmed malaria cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	20	1.5	18	1.4
Female	4	0.6	6	0.9
Male	16	2.5	12	1.9
	Age Analysis (in years)		Age Analysis (in years)	
Average	28.2		30.7	
Median	28.2		28.9	
St. Dev.	14.6		18.2	
Min. Age	1.0		0.0	
Max. Age	52.5		90.3	

Table 36: Number of laboratory-confirmed malaria cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=20)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	0	0.0	0	0.0
1-4	1	3.1	0	0.0
5-9	1	2.5	1	2.4
10-14	0	0.0	1	2.4
15-19	0	0.0	0	0.0
20-24	1	2.1	5	10.1
25-29	0	0.0	1	2.2
30-39	0	0.0	4	4.7
40-59	1	0.6	4	2.3
Over 60	0	0.0	0	0.0

Table 37: Number of laboratory-confirmed malaria cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	20	1.5	18	1.4
Winnipeg	17	2.3	14	2.4
Southern Health-Santé Sud	1	0.5	0 - 1	0.4
Interlake-Eastern	0	0.0	0 - 1	0.3
Prairie Mountain Health	1	0.6	2	1.2
Northern	1	1.3	0 - 1	0.8

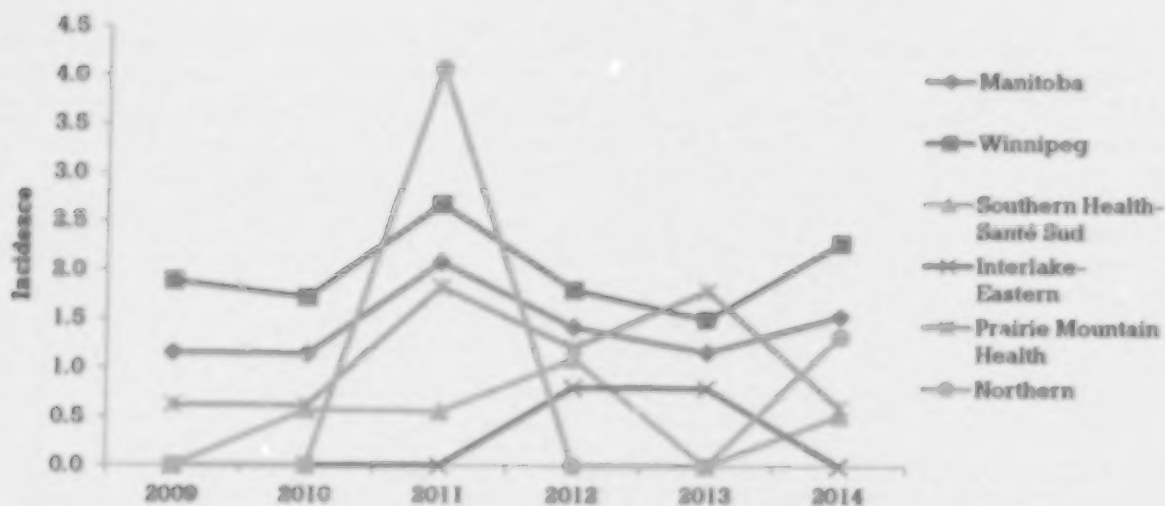


Figure 34: Malaria incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Strongyloidiasis

Table 38 shows the incidence rate of strongyloidiasis in 2014 was similar to the incidence rate of strongyloidiasis in the 5-year average (1.7 cases per 100,000 persons, compared to 1.8 cases per 100,000 persons). In 2014, as in the 5-year average, males experienced an incidence rate of strongyloidiasis almost double the female incidence rate (Table 38). In 2014, the highest female incidence occurred in the 25-29 age group with 4.4 cases per 100,000 persons; the highest male incidence occurred in the 30-39 age group with 5.9 cases per 100,000 persons (Table 39).

Table 38: Number of laboratory-confirmed strongyloidiasis cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	23	1.7	23	1.8
Female	7	1.1	9	1.3
Male	15	2.3	15	2.3
	Age Analysis (in years)		Age Analysis (in years)	
Average	39.1		33.3	
Median	37.8		32.0	
St. Dev.	15.9		19.7	
Min. Age	6.9		1.2	
Max. Age	72.3		90.4	

Table 39: Number of laboratory-confirmed strongyloidiasis cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=22)

Age Group	Female		Male	
	Case Count	Incidence	Case Count	Incidence
<1	0	0.0	0	0.0
1-4	0	0.0	0	0.0
5-9	0	0.0	1	2.4
10-14	1	2.6	0	0.0
15-19	0	0.0	0	0.0
20-24	1	2.1	1	2.0
25-29	2	4.4	0	0.0
30-39	2	2.3	5	5.9
40-59	0	0.0	7	4.0
Over 60	1	0.7	1	0.8

Table 40 shows Winnipeg RHA had the highest incidence of strongyloidiasis in 2014 with 2.8 cases per 100,000 persons. In fact, Winnipeg RHA had the highest incidence rate over all six years from 2009 to 2014 (Figure 35). Southern Health-Santé Sud and Interlake-Eastern RHA had no laboratory-confirmed cases of strongyloidiasis in 2014—Northern RHA had no laboratory-confirmed cases of strongyloidiasis from 2009 to 2014. An interesting peak in incidence rates was seen for most of the RHAs in 2011.

Table 40: Number of laboratory-confirmed strongyloidiasis cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

RHA	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Manitoba	22	1.7	23	1.8
Winnipeg	21	2.8	21	3.0
Southern Health-Santé Sud	0	0.0	2	0.7
Interlake-Eastern	0	0.0	0 – 1	0.3
Prairie Mountain Health	1	0.6	0 – 1	0.1
Northern	0	0.0	0	0.0

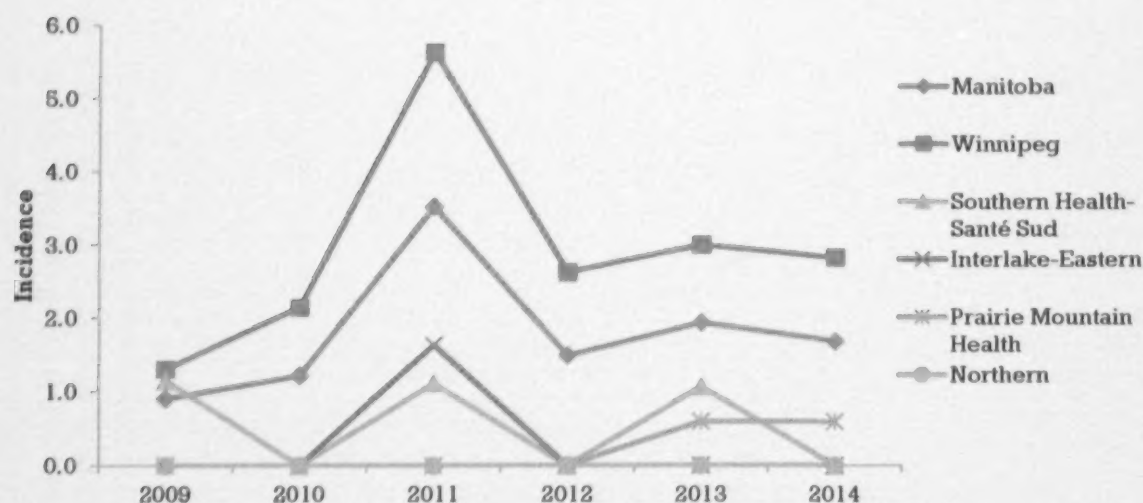


Figure 35: Strongyloidiasis incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Respiratory Diseases

Respiratory diseases are any of the diseases or disorders that affect the human respiration system. For this report, only laboratory-confirmed respiratory diseases that were listed as reportable under *The Public Health Act* were included. Table 41 shows there were two respiratory diseases reported to MHLS in 2014: leprosy and parapertussis. Neither disease had greater than five laboratory-confirmed cases in 2014, so there will not be a detailed analysis performed.

Table 41: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each respiratory disease confirmed in Manitoba, 2009-2014

Disease Name	2009		2010		2011		2012		2013		2014	
	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence
Leprosy*	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
Parapertussis*	2	0.2	0	0.0	1	0.1	3	0.2	3	0.2	4	0.3

* Disease with a case count ≤ 5 in 2014; will not have a detailed analyses performed

Other Diseases

For the purposes of this report, the term "other diseases" is used for those diseases not easily captured in the other broad groupings. Table 42 shows there were six diseases classified as "other" reported to MHLS in 2014. However, only Invasive Beta-hemolytic streptococcal disease had a sufficiently large number of reported cases in 2014 to warrant an in-depth analysis (see Methods, page 12)

Table 42: The number of laboratory-confirmed cases and incidence rates (per 100,000 persons) for each 'other' disease confirmed in Manitoba, 2009-2014

Disease Name	2009		2010		2011		2012		2013		2014	
	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence	Case Count	Incidence
Creutzfeldt-Jakob Disease (C.J.D.)*	3	0.2	0	0.0	1	0.1	0	0.0	1	0.1	1	0.1
Invasive Beta-hemolytic Streptococcal Disease	251	20.7	225	18.3	272	21.8	304	23.9	313	24.3	280	21.4
Necrotizing Fasciitis*	3	0.2	12	1.0	3	0.2	3	0.2	19	1.5	5	0.4
Staphylococcus aureus (Toxic Shock)*	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1
Streptococcal Glomerulonephritis*	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0
Streptococcal Toxic Shock Syndrome (STSS)*	2	0.2	0	0.0	1	0.1	0	0.0	4	0.3	2	0.2
Viral Hepatitis, Other (all types of hepatitis <u>excluding</u> A, B, and C)	0	0.0	6	0.5	0	0.0	2	0.2	3	0.2	2	0.2

* Disease with a case count ≤ 5 in 2014; will not have a detailed analyses performed

Note: "Other" refers to a disease that is not: a nosocomial and/or antibiotic resistant disease, not an enteric disease, not a vaccine preventable disease, not a zoonotic or environmental disease, and not a respiratory disease.

Invasive Beta-hemolytic Streptococcal Disease

This category includes *all* beta-hemolytic streptococcal species isolated from normally sterile sites. The 2014 incidence rate (21.4 cases per 100,000 persons) is similar to the 5-year average incidence rate (21.8 cases per 100,000 persons) (Table 43). Children less than one-year old and adults over the age of 60 had the highest incidence rates of invasive beta-hemolytic streptococcal disease in 2014 (Figure 36). Females less than one-year old experienced 76.0 cases per 100,000 persons (6 cases in 2014), while males less than one-year old experienced 93.9 cases per 100,000 persons (8 cases in 2014). Females over the age of 60 experienced 37.8 cases per 100,000 persons (54 cases in 2014), while males over the age of 60 experienced 65.4 cases per 100,000 persons (79 cases in 2014).

Table 43: Number of laboratory-confirmed invasive beta-hemolytic streptococcal disease cases and incidence rates (per 100,000 persons) by sex, with age analysis, in Manitoba, 2014 and 5-year average (2009-2013)

	2014		2009-2013 Average	
	Case Count	Incidence	Case Count	Incidence
Total	280	21.4	273	21.8
Female	124	18.8	125	19.7
Male	156	24.1	149	24.0
	Age Analysis (in years)		Age Analysis (in years)	
Average	54.9		50.5	
Median	58.7		54.2	
St. Dev.	24		24.7	
Min. Age	0		0	
Max. Age	100.3		99.4	

Note: one case with unknown gender and one case with unknown age were left out of male/female breakdown and age analysis for the 2009-2013 average, respectively.

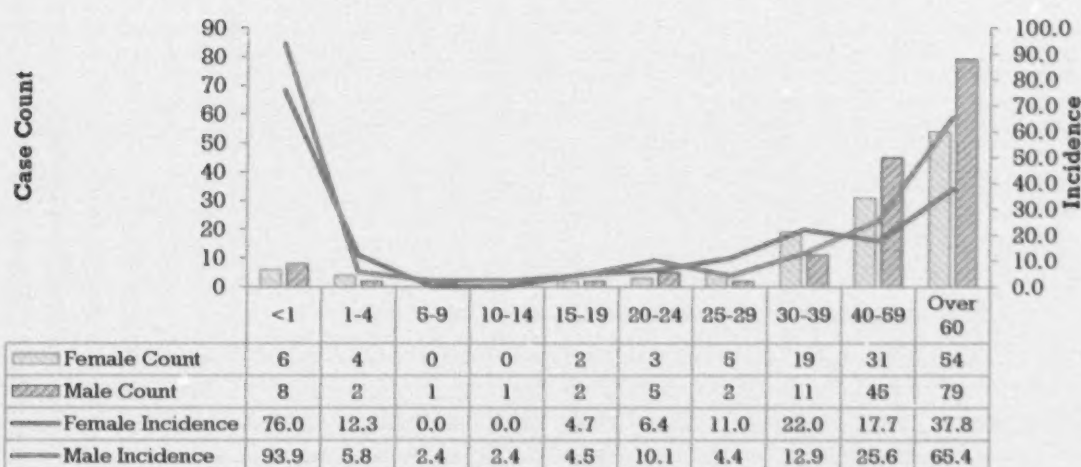


Figure 36: Number of laboratory-confirmed invasive beta-hemolytic streptococcal disease cases and incidence rates (per 100,000 persons) by age group and sex in Manitoba, 2014, (N=280)

Figures 37 and 38 indicate Northern RHA had the highest incidence of invasive beta-hemolytic streptococcal disease of all the RHAs, from 2009 to 2014, with an incidence rate of 45.1 cases per 100,000 persons in 2014. Winnipeg RHA had the second highest incidence rate from 2009 to 2013 but, in 2014, Interlake-Eastern RHA had the second highest incidence rate with 24.5 cases per 100,000 persons.

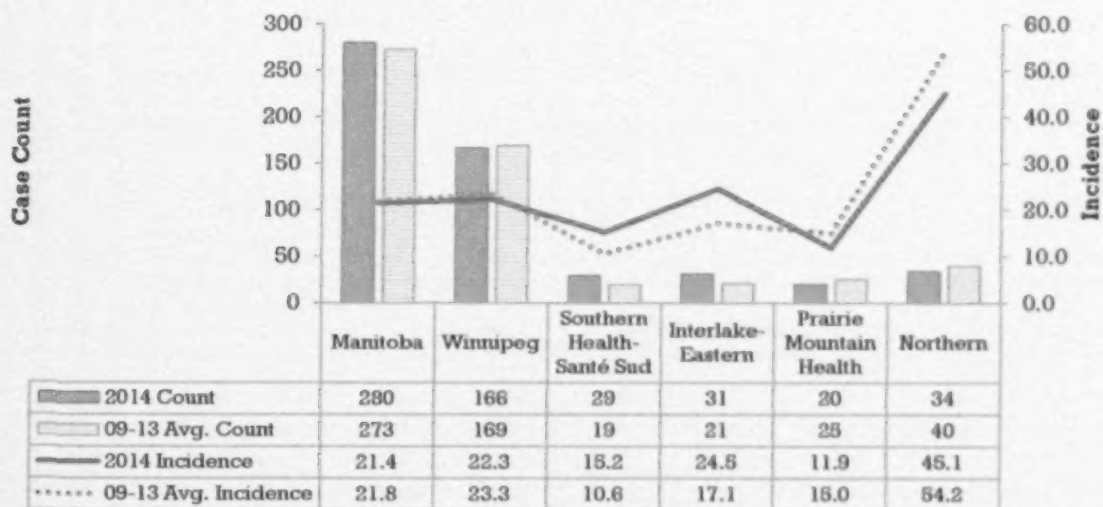


Figure 37: Number of laboratory-confirmed invasive beta-hemolytic streptococcal disease cases and incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2014 and 5-year average (2009-2013)

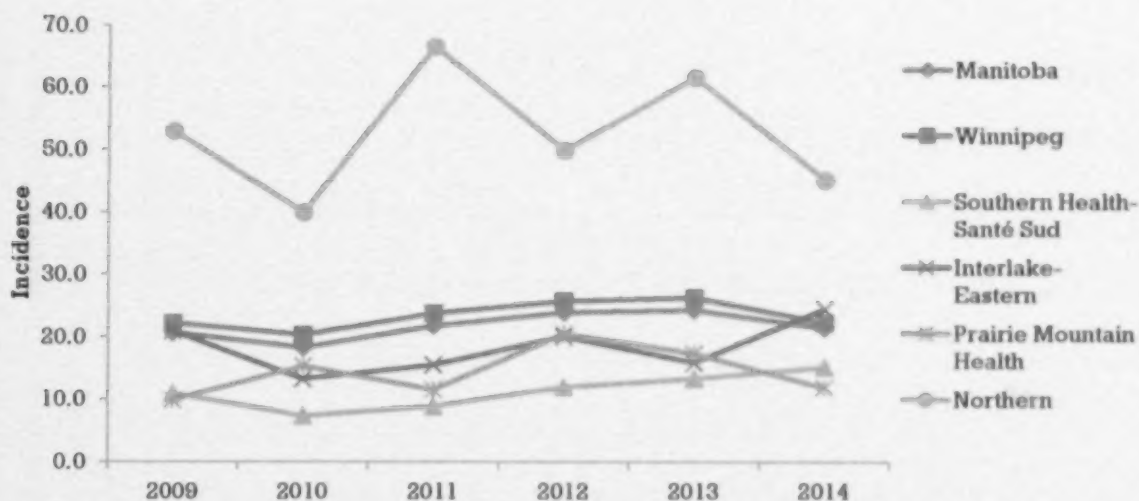


Figure 38: Invasive beta-hemolytic streptococcal disease incidence rates (per 100,000 persons) by regional health authority (RHA) in Manitoba, 2009-2014

Appendix A – Reportable Diseases List, 2014

The following diseases and/or conditions are (human) reportable diseases in Manitoba for the year 2014, as prescribed by *The Reporting of Diseases and Conditions Regulation*³ under *The Public Health Act*.

Table 44: Reportable Diseases List, 2014

Common name	Scientific or technical name of disease or its infectious agent
* AIDS	Acquired Immunodeficiency Syndrome
Amoebiasis	<i>Entamoeba histolytica</i>
* + Anthrax	<i>Bacillus anthracis</i>
* + Avian Influenza	Influenza A virus, select Hemagglutinin and Neuraminidase types
Blastomycosis	<i>Blastomyces dermatitidis</i>
* + Botulism	<i>Clostridium botulinum</i>
Brucellosis	<i>Brucella</i> species
Campylobacter	<i>Campylobacter</i> species
Cancer or malignant neoplasm	Cancer or malignant neoplasm
Chancroid	<i>Haemophilus ducreyi</i>
Chlamydia	<i>Chlamydia trachomatis</i>
+ Cholera	<i>Vibrio cholerae</i> , typable
<i>Clostridium difficile</i> toxin	<i>Clostridium difficile</i>
<i>Clostridium perfringens</i> (except wound specimens)	<i>Clostridium perfringens</i>
* Congenital Rubella Infection/Syndrome	Rubella virus
Cryptosporidium	<i>Cryptosporidium parvum</i>
Cyclospora	<i>Cyclospora cayentanensis</i>
* Creutzfeldt-Jakob Disease	Creutzfeldt-Jakob disease prion
Dengue Fever	Dengue virus
* + Diphtheria (Cases and Carriers)	Toxigenic <i>Corynebacterium diphtheriae</i> (all subspecies)
* Encephalitis	Encephalitis
Fish Tapeworm	<i>Diphyllobothrium latum</i> (<i>Dibothriocephalus latus</i>)
Food poisoning caused by <i>Bacillus cereus</i>	<i>Bacillus cereus</i>
Giardia	<i>Giardia lamblia</i>
Gonorrhea	<i>Neisseria gonorrhoeae</i>
Hantavirus	Hantavirus

³ Manitoba Health, Healthy Living and Seniors. (2009). *Reporting of Diseases and Conditions Regulation*. Available at: http://web2.gov.mb.ca/laws/regis/current/_pdf-regis.php?reg=37/2009. Accessed: September 24, 2014

Common name	Scientific or technical name of disease or its infectious agent
* Haemophilus influenza invasive disease from typeable Haemophilus organisms	<i>Haemophilus influenzae</i>
* + Hemolytic Uremic Syndrome (HUS)	Hemolytic Uremic Syndrome
Hepatitis A	Hepatitis A virus
Hepatitis B	Hepatitis B virus
Hepatitis C	Hepatitis C virus
Hepatitis, Viral (Other)	Hepatitis viruses other than A, B or C
HIV	Human immunodeficiency virus
Influenza A	Influenza A viruses
Influenza B	Influenza B viruses
Legionellosis	<i>Legionella pneumophila</i>
* Leprosy	<i>Mycobacterium leprae</i>
* LGV	<i>Lymphogranuloma venereum</i> (<i>Chlamydia trachomatis</i>)
Listeriosis invasive disease	<i>Listeria monocytogenes</i> in normally sterile tissue
* Lyme Disease	<i>Borrelia burgdorferi</i>
Malaria	<i>Plasmodium falciparum</i> <i>Plasmodium vivax</i> <i>Plasmodium malariae</i> <i>Plasmodium ovale</i>
* + Measles	Rubella virus
* + Meningococcal invasive disease	<i>Neisseria meningitidis</i>
Methicillin Resistant <i>Staphylococcus aureus</i> (MRSA)	<i>Staphylococcus aureus</i> with Methicillin resistance
* Mumps	Mumps virus
Parapertussis	<i>Bordetella parapertussis</i>
Parasitic Diseases other than amoebiasis, cryptosporidium, cyclospora, fish tapeworm, giardia, malaria, strongyloidiasis, toxoplasmosis, trichinosis and trypanosomiasis	
Parrot Fever (Psittacosis)	<i>Chlamydia psittaci</i>
Penicillin resistant pneumococci	<i>Streptococcus pneumoniae</i> with penicillin resistance
* Pertussis	<i>Bordetella pertussis</i>
Plague	<i>Yersinia pestis</i>
Pneumococcal invasive disease (any normally sterile body site)	<i>Streptococcus pneumoniae</i>
* + Polio	Poliovirus
Q fever	<i>Coxiella burnetii</i>
* + Rabies	Rabies virus

Common name	Scientific or technical name of disease or its infectious agent
Relapsing Fever	<i>Borrelia recurrentis</i> <i>Borrelia duttoni</i>
Rickettsial Diseases other than Rocky Mountain Spotted Fever, Q-fever and typhus	
Rocky Mountain Spotted Fever	<i>Rickettsia rickettsii</i>
* Rubella	Rubella virus
Salmonella	<i>Salmonella</i> species
* + Severe Acute Respiratory Syndrome (SARS)	SARS coronavirus
* + Severe Respiratory Illness (SRI)	Severe Respiratory Illness
Shigella	<i>Shigella</i> species
* + Smallpox	<i>Varicella major virus</i> <i>Varicella minor virus</i>
Staphylococcal Food Poisoning	<i>Staphylococcus aureus</i>
* Staphylococcal Toxic Shock Syndrome	<i>Staphylococcus aureus</i> in blood or normally sterile tissue in association with Toxic Shock Syndrome
<i>Strep. Hemolytic Streptococcal invasive disease, typable</i>	<i>Strep. Hemolytic Streptococcal</i> typable species in blood or normally sterile tissue. (Includes all samples of <i>Strep.</i> Group A, B, C, D, E, F or G found in blood, sterile tissue or internal aspirates — not in skin or wounds.)
* Streptococcal Necrotizing Fasciitis	<i>Streptococcus</i> species in blood or normally sterile tissue in association with Necrotizing Fasciitis. (Includes all samples of <i>Strep.</i> Group A, B, C, D, E, F or G found in tissue or wounds that are accompanied by a clinical assessment of NF.)
* Streptococcal Necrotizing Myositis	<i>Streptococcus</i> species in blood or normally sterile tissue in association with Necrotizing Myositis. (Includes all samples of <i>Strep.</i> Group A, B, C, D, E, F or G found in tissue or wounds that are accompanied by a clinical assessment of NM.)
* Streptococcal Toxic Shock Syndrome	<i>Streptococcus</i> species in blood or normally sterile tissue in association with Toxic Shock Syndrome. (Includes all samples of <i>Strep.</i> Group A, B, C, D, E, F or G found in blood that are accompanied by a clinical assessment of TSS.)
Strongyloidiasis	<i>Strongyloides stercoralis</i>
Syphilis	<i>Treponema pallidum pallidum</i>
* Tetanus	<i>Clostridium tetani</i>
Toxoplasmosis	<i>Toxoplasma gondii</i>
Trichinosis	<i>Trichinella spiralis</i>
Trypanosomiasis	<i>Trypanosoma</i> species

Common name	Scientific or technical name of disease or its infectious agent
* Tuberculosis — respiratory	<i>Mycobacterium tuberculosis</i> <i>Mycobacterium abscessus</i> <i>Mycobacterium goodii</i> <i>Mycobacterium fortuitum</i>
Tuberculosis — other	<i>Mycobacterium</i> species (non-tuberculosis)
Tularemia	<i>Francisella tularensis</i>
Typhoid Fever	<i>Salmonella typhi</i>
Typhus	<i>Rickettsia</i> species
Vaccinoplasma Resistant Enterovirus (VRE)	<i>Enterovirus</i> species with vaccinoplasma resistance
Vaccinoplasma Resistant Enterovirus (VRE)	<i>Enterovirus</i> species with vaccinoplasma resistance
Vaccinoplasma producing organisms	Vaccinoplasma producing organisms
Vibrio parahaemolyticus	<i>Vibrio parahaemolyticus</i>
* * Viral Haemorrhagic Fever	Viral Haemorrhagic Fever
West Nile Virus (WNV)	West Nile virus
Western Equine Encephalitis	Western Equine Encephalitis virus
* Yellow Fever	Yellow fever virus
Yersinia infections	<i>Yersinia pseudotuberculosis</i> <i>Yersinia enterocolitica</i>

* A health professional must make a report reporting the reportable disease if the health professional becomes aware that a person (i) has or may have the reportable disease, or (ii) recently had or may have had the reportable disease (clause 3(e) of the Reporting of Diseases and Conditions Regulation).

* The person in charge of the laboratory must make a report of a reportable disease, to the chief public health officer no later than the day, not including a Saturday or a holiday, after the day that the positive result was isolated and confirmed. In addition, the person in charge of the laboratory must also, within the same period, report the existence of the positive result by telephone to the chief public health officer (clause 3(2)(e) of the Reporting of Diseases and Conditions Regulation).

Appendix B – Laboratory confirmed, reportable diseases present in Manitoba, in 2014, ranked by case count

Table B1 includes only those laboratory-confirmed, reportable diseases, present in Manitoba, in 2014. Any diseases that are within the scope of the report, but not shown in Table B1, had zero cases in 2014.

Table B1: The number of laboratory-confirmed cases, incidence rates (per 100,000 persons), and proportion of total case count for each reportable disease, infection, and/or organism confirmed in Manitoba, in 2014, ranked by case count

Rank	Disease Name	Case Count	Incidence	Proportion of Total Cases
1	<i>Neisseria meningitidis</i> <i>Streptococcus pneumoniae</i> (MDS)	4,352	277.8	18.87%
2	<i>Varicella</i> <i>Measles</i> <i>Scarlet fever</i> (MDS)	1,274	130.8	10.12%
3	<i>Clostridium difficile</i> infection	881	87.8	10.17%
4	<i>Legionella pneumophila</i> <i>Streptococcus</i> <i>Dysentery</i>	280	28.8	3.23%
5	<i>Salmonella</i>	218	17.8	2.49%
6	<i>Campylobacter</i>	174	16.8	1.98%
7	<i>Legionella pneumophila</i> <i>Dysentery</i> (MDS)	132	13.8	1.54%
8	<i>Cryptosporidium</i>	113	11.7	1.33%
9	<i>Candida</i>	88	8.8	1.02%
10	<i>Shigella</i>	82	8.7	1.01%
11	<i>Yersinia enterocolitica</i> <i>Escherichia coli</i> (VTEC)	82	8.7	1.01%
12	<i>Amoeba</i>	58	5.8	0.68%
13	<i>Stenotrophomonas</i>	52	5.7	0.62%
14	<i>Yersinia</i>	51	5.6	0.59%
15	<i>Salmonella</i>	50	5.6	0.58%
16	<i>Haemophilus</i>	48	5.3	0.57%
17	<i>Parvovirus</i>	43	4.3	0.50%
18	<i>Legionella pneumophila</i> <i>Shigella</i> <i>Dysentery</i> (MDS)	42	4.2	0.49%
19	<i>Shigella</i>	38	3.7	0.44%
20	<i>Legionella</i>	38	3.8	0.44%
21	<i>Cryptosporidium</i>	28	2.8	0.33%
22	<i>Neisseria meningitidis</i>	28	2.8	0.33%
23	<i>Escherichia coli</i> <i>Salmonella</i>	28	2.8	0.33%
24	<i>Parvovirus</i>	28	2.8	0.33%
25	<i>Legionella</i>	28	2.8	0.33%
26	<i>Clostridium perfringens</i>	28	2.8	0.33%
27	<i>Legionella pneumophila</i> <i>Dysentery</i> (MDS)	28	2.8	0.33%
28	<i>Shigella</i>	28	2.8	0.33%
29	<i>Legionella</i>	28	2.8	0.33%
30	<i>Legionella</i>	28	2.8	0.33%
31	<i>Streptococcus</i> <i>Yersinia</i> <i>Shigella</i> <i>Dysentery</i> (MDS)	28	2.8	0.33%
32	<i>Parvovirus</i>	28	2.8	0.33%
33	<i>Parvovirus</i>	28	2.8	0.33%
34	<i>West Nile virus</i> <i>Shigella</i> <i>Dysentery</i>	28	2.8	0.33%
35	<i>Legionella</i>	28	2.8	0.33%
36	<i>Clostridium difficile</i> <i>Shigella</i> <i>Dysentery</i> (CJD)	28	2.8	0.33%
37	<i>Legionella</i>	28	2.8	0.33%
38	<i>Legionella</i>	28	2.8	0.33%
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